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ABSTRACT

This study explores some experiences in recycling buildings for schools and suggests a background to use in planning and evaluating this approach to school space acquisition. Such factors as educational program, physical environment, building codes, cost and financing, legal issues, administrative processes and time, and political and social concerns are considered in the study. Case studies on schools in recycled buildings, derived from school visits, interviews, and examinations of files, provided the primary source of information. Laws, State administrative practices, current planning considerations, and building codes were studied separately. The study focuses on school facility practices in New York State, with secondary attention, primarily for comparative purposes, to Massachusetts and Pennsylvania. A computer program was used to examine the relative costs of found space facilities to new school buildings. (Author/MLF)

THE CONVERSION OF FOUND SPACE FOR EDUCATIONAL USE

by

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To Judy

for her boundless patience, understanding, and support.

ABSTRACT

Diverse problems regarding educational facilities, such as inflationary costs, enrollment, land use, curricular and space pressures, have led educators to seek alternatives to building new schools. The conversion of found space, converting buildings not originally intended for school use - e.g., factories, warehouses, storefronts - is one alternative that is currently gaining increased attention.

It has not yet been clearly demonstrated whether converting non-school buildings is an advantageous alternative to building new schools. This study, therefore, explores some experiences in recycling buildings for schools and suggests a background for planning and evaluating this approach to school space acquisition.

Such factors as educational program, physical environment, building codes, cost and financing, legal issues, administrative processes and time, and political and social concerns are all viewed as important in the planning and development of a school building and are considered in this study. Focusing on only one of these in the examination at found space conversion would distort the total picture.

Case studies on actual schools in recycled buildings, derived from school visits, interviews, and examinations of files, provided the primary source of information. Laws, state administrative practices, current planning considerations, and

building codes were studied separately. The study focuses on school facility practices in New York State, with secondary attention - primarily for comparative purposes - to Massachusetts and Pennsylvania.

A computer program was written in order to examine the relative costs of found space facilities to new school buildings. The usual method of calculating school building costs, based on the sum of the components, is unsuitable for projecting building lifetime costs, nor does it give a valid basis for comparing costs of buildings acquired under different financing alternatives. Therefore, a simulation model was devised based on present value formulae for projecting lifetime costs of alternative school facilities.

As a conclusion of this research the basic invention of educational facilities planning was rediscovered and reinterpreted as a valid set of procedures for approaching found space conversion. Ironically, planning has been lacking in the conversion of many buildings - perhaps due to inexperience with found buildings or because found buildings have been used merely to tide over during an emergency or because they are viewed as temporary facilities. Such reasons do not justify taking a haphazard of makeshift approach to found space conversion any more than in new school construction.

The absence of planning at local levels reflects policies and procedures at higher levels. In New York State found space conversion in the past has been viewed as little more than a temporary or emergency solution to school space needs. And current laws are confusing and inhibit public school use of

existing buildings.

The essential point in careful planning is that each situation be treated separately. As a generic form, while inherently neither superior nor inferior to new school buildings, it is clear that found space offers an alternative for permanent, on-going educational programs and, at least as well as new school buildings, serves program revitalization, innovation, and educational purpose reassessment for beyond its immediate objectives of fulfilling space needs.

Initial expectations of finding discrete patterns, advantages, and disadvantages in found space conversion as compared to new school buildings did not emerge often or conclusively. It was anticipated, for example, that the physical constraints inherent in found buildings would lead to increased adaption and creativity in converting the physical environment and the resultant educational program. Creative physical and educational program adaption, while common in the schools visited, is neither inherent in the process nor essential to a satisfactory result in the conversion of found buildings - any more than it is for the planning and constuction of a new building.

All outcomes depend on a myriad of factors which can best be dealt with by careful planning. Each instance must be considered separately on the basis of local needs, constraints, alternatives, and opportunities. The body of the report offers insights, experiences, and tools to help broaden understanding and enlighten decisions. Relevant chapters are entitled: Simulation Model for Projecting Alternative School Facility Costs; Survey of Use of Found Space; Current Practices in New York

State; Found Buildings: Code and Renovation Considerations; Educational and Environmental Programs; Costs; and Tradeoffs and Evaluation of Alternatives in Planning.

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A study of this type would be impossible without broad cooperation and assistance. I am particularly grateful to the National Institute of Education, U.S. Department of Health, Education and Welfare, and to the Educational Facilities Laboratories, Inc. for the support which made this study possible. Both of these institutions gave me free rein to pursue this research and exhibited unpressured patience when the study grew more complicated and took longer than had originally been anticipated. I am additionally grateful to EFL for the use of their many resources, including their fine library and the help and encouragement of their staff.

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INTRODUCTION

Educators, especially in urban areas, free school advocates seeking innovation, and others concerned with school facilities are discovering in the conversion of found space an alternative to new school construction. Yet it has not been demonstrated clearly whether converting non-school buildings is an advantageous alternative to building new schools. This study, therefore, explores some experience to date in recycling found buildings for schools and suggests a background for planning and evaluating this approach to school space acquisition.

Background to Study

Enrollment demands, inflationary construction costs, public resistance to tax increases, municipal debt limitations, scarcity of unencumbered sites, and inadequacy of traditional school facilities for educational program innovations are among the pressures that have led educational administrators, school board members, and facility planners to seek mechanisms alternative to new construction for acquiring school space.

Combined occupancy development (development of the air rights over school buildings), shared use of buildings, leasing of space, turnkey building arrangements, and conversion of found space (renovating old factories, warehouses, storefronts, churches, catering halls, etc. for educational

use) are among the alternatives that have been tried with varying degrees of success. Some of these approaches to space acquisition have been studied.[1] The conversion of found space, however, has not yet been examined in any depth.

While the idea of recycling buildings is by no means new, it is only within the past few years that it has begun to receive widespread attention from the lower public education community, largely as a result of descriptive publications by the Educational Facilities Laboratories[2] and an increasing number of magazine articles popularizing the idea. Though found space conversion is still regarded by many educators as an inherently inferior solution to physical environmental and educational program needs in school facilities, justifiable only under emergency circumstances, on the other end of the spectrum are those who enthusiastically embrace the alternative, asserting that found space is cheaper than a new building, faster than new construction, more flexible and/or less confining educationally, and that it is a pragmatic means of getting around political and bureaucratic barriers. Higher costs, tighter budgets, and the

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[1]There have been numerous studies on the application of the systems approach to school buildings. Systems by Dan Griffin (New York: Educational Facilities Laboratories, 1971) presents a good overview and summary of the subject. And James P. Meier, Combined Occupancy Development: A Stimulus for New School Construction in Urban Areas, (New York: Educational Facilities Laboratories, 1971).

[2]E.g. Two important descriptive publications from the Educational Facilities Laboratories are: Places and Things for Experimental Schools, (New York: EFL, and Experimental Schools Inc., 1972) and Found Spaces and Equipment for Children's Centers, (New York: EFL, 1972).

uncertainty of the present "energy crisis" have further exacerbated the dilemmas and pressures on educational administrators and decision makers, with the effect of enhancing the attractiveness of found space.

Despite the lack of concrete information on the value of recycling non-school facilities, various studies and high officials have recommended increased consideration of found space conversion for schools. In his last capital budget message as New York City Controller, the present Mayor Abraham Beame advocated the purchase of existing buildings for schools in order to affect short-term overcrowding and subsequent reconversion of these buildings to other uses when the neighborhoods no longer need them as schools.[1] The Fleischmann Commission Report was even more emphatic recommending: "that, prior to construction of new school buildings, found space alternatives for possible renovation and purchase or lease be fully explored. Only when found environments are determined to be inferior to new construction, based on such considerations as location, spatial quality and cost benefit, should new construction be undertaken."[2] The report also noted the limitations of existing data and the insufficiency of a basis on which to suggest guidelines.

Clearly there is a need for the distillation of experiences

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[1]N.Y.C Controller's report on 1974-5 capital budget, as noted in the New York Times, 15 October 1973, p. 30.

[2]The Fleischmann Report on the Quality, Cost and Financing of Elementary and Secondary Education in New York State, 3 Vols., (New York: Viking Press, 1973), 2:141.

in found space usage not only to evaluate past efforts, but also to establish guidelines for assessing the found space alternative as opposed to new school construction. Of course this must be done in the context of the issues surrounding school planning decisions. Such are the intentions of this study.

The study focuses primarily on New York State; some references are made to Massachusetts and Pennsylvania as a means of comparing and giving perspective. Despite the limitations of the examples and the legislative and procedural backgrounds which provide a context for analysis, the study hopefully will have relevance for situations in other places.

This report is divided into two parts. The first part, composed of chapters I through III, provides a background for the study and a context for planning and outlines the methods of investigation and cost analysis. Part II, including chapters IV-IX, discusses the findings of this exploratory investigation. Planning is the common link in the discussion of the various aspects of converting found space.

PART I

BACKGROUND AND METHODOLOGY

CHAPTER I

BACKGROUND - PLANNING CONTEXT

In the final analysis the success of any educational facility depends upon the balanced interrelationship of a variety of factors including the suitability of the physical environment for specific educational programs, cost and time factors, and a number of less tangible social and political considerations. Consequently, planning an educational facility requires juggling of a unique combination of needs and resources, while considering a variety of problems and issues. Many of the problems currently plaguing the planning and acquisition of school facilities have been propounded as justification for found space conversion. This chapter provides a context for the study by outlining broad issues pertinent to all school facilities and discusses their particular relevance for decisions involving found space use.

Enrollment Trends and School Building Needs

Predicting needs and providing facilities for future student enrollments has led to frustration for many local school district officials. Demographic cycles and imperfect and/or haphazardly applied enrollment projection techniques have caught many districts ill-prepared or out of step. During the last decade the problem of insufficient preplanned or available school buildings for the rapid enrollment growth

resulted in the building of many new schools. That school construction boom now appears to have been ill-timed: with declining birthrates and population shifts an increasing number of school districts have been forced to close unneeded school buildings.

The failure to predict or adjust to these trends has led administrators and researchers in two directions: (1) toward improving forecasting techniques and promoting their widespread use by local school districts; and (2) toward finding more flexible solutions to facility acquisition and disposition. The latter direction in particular has been proposed by found space advocates. Found space conversion is viewed as a more flexible solution than new school building to enrollment fluctuations, short-term space needs, and - admitting to the shortcomings of forecasting and planning - enrollment uncertainty.

On a national scale the current energy crisis is potentially the most important factor affecting future population trends and settlement patterns. The continuation of the steady population shifts witnessed in the past few decades from the inner cities to increasingly distant new suburbs is now in question. Just what effect the energy situation will have on life styles, economic patterns, and municipal growth is by no means clear. There is good reason to speculate that many recent trends could be reversed; a decline in exurban spread, a renewed emphasis on mass transit, consequent consolidation of housing patterns, all could easily redound to the benefit of older cities and suburbs. In such a case, existing

buildings would be an opportune resource to meet growing school space needs. Predicting social trends is speculative but important for awareness in planning.

A more immediately pressing issue, however, now that the post-war baby boom has passed and school closings are the predominant trend in school facilities, is whether any new school buildings will be needed at all. In its 1973 annual report the U.S. Census Bureau revealed that, as a result of lower birth rates, elementary school enrollments declined for the third straight year. This downward trend is expected to continue until at least 1980.[1] In New York State total public school enrollments, after having doubled since 1945, are expected now to level off at 3.6 to 3.7 million students and decline toward the end of the 1970s.[2]

Population shifts and declining school enrollments are not the only factors demanding attention. In some areas as older buildings deteriorate and/or become obsolete for new educational programs the need for space often becomes urgent. In New York State alone 566 currently used school buildings, representing 375,000 pupil places, were constructed before 1920.[3] Over 150 school buildings constructed prior to 1910

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[1]Cited in "Reduced Birth Rate Cuts Enrollments in Lower Grades," New York Times, March 26, 1974, p. 43.

[2]The Fleischmann Report on the Quality, Cost and Financing of Elementary and Secondary Education in New York State, 3 Vols., (New York: Viking Press, 1973), I:1-9.

[3]Based on New York State Basic Educational Data System data (BEDS), and data supplied by the New York City Board of Education, School Planning and Research Division (SPRD).

are in use in New York City alone.[1] About 50 of these dilapidated, non-fireproof masonry and wood frame structures with fire and health code violations have been marked for replacement but are still in operation because of new building construction delays.[2] Given as a general rule a 50-year school building life expectancy,[3] it becomes clear that the space need is by no means over. In fact, it is estimated that by 1980, despite the projected enrollment decline, a cumulative total of between 600,000 and 650,000 pupil places will be required to replace obsolete and substandard facilities in New York State alone.[4]

Thus it appears clear that additional educational space will be needed, if only to replace outmoded school buildings. Surely found space can fill part of the need, while avoiding the risk inherent in new school buildings, given fluctuating population trends.

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[1] Ibid.

[2] "Gives Reasons for Delays in Replacing Aged Schools," New York Daily News, February 13, 1974, p. ML7.

[3] Estimations of expected life use of buildings, in the final analysis, depend on highly detailed examinations of individual buildings. Lacking such information, appraisal companies generalize a 45- to 50-year expected life to school buildings.

[4] Fleischmann Report, 2:160-161.

Educational Programs

The recent school reform movement has arisen out of dissatisfaction with conventional education practices. Although in most places traditional approaches, characterized by the self-contained classroom, still prevail, many school facilities have developed open plans, cluster plans, individual study carrels, media centers, informal classrooms, and the like, in response to calls for change.

Even more important than which educational program is chosen, however, is the thoroughness of the processes by which the program is selected or evolved. The construction of a new facility can provide a unique opportunity for a fundamental reevaluation of educational needs, directions, and objectives; yet this opportunity is rarely seized. Unfortunately, in the construction of the typical new school building, educational program needs and opportunities receive the least consideration. Instead, past patterns are replicated, new ones are selected as if out of a catalog, or state regulations and guidelines are taken as a basic model rather than as a guiding checklist. Unquestionably, planning and constructing a school building is complicated. Part of the problem for most local school districts is the seemingly unending series of activities and decisions related to financing, public relations, contract negotiations, and a bewildering set of state approvals. With pressing demands such as these, it is easy to understand why most decision-makers have little time to reflect on education programs. Thus the most basic issue

gets attention last and least, often only when unexpected snags, such as budget limitations, site or plan constraints, or political tradeoffs, force the reconsideration of initial program specifications.

Found space, of course, in contrast to new buildings, immediately presents many physical preconditions and limitations. A question which consequently arose during the course of this study was whether the built-in constraints of found buildings would limit the pro forma imposition of conventional educational programs and instead lead to more creative facility designs - a case of necessity mothering invention. It was reasoned that the prominence in found buildings of unconventional physical conditions could prompt early and more serious deliberation by school officials and planners over educational program and physical environment issues. These issues are frequently taken for granted or left to the architect. Consequently it was also anticipated that educational programs in found space schools, rather than settle for compromise, instead would foster more adaptive and innovative thinking than do most new school buildings. The findings in this regard did not entirely follow expectations.

The Physical Environment

Of all the factors determining the quality of an educational facility, it is the architecture that most directly supports or interferes with the educational program. The physical environment of an educational facility in and of itself is a complex entity possessing thermal, spatial, visual,

acoustical, and purely aesthetic characteristics which, in each unique combination, affect human physical comfort. Our perception of and response to any building derives from the total set of environmental conditions. A change in one aspect of an environment to some degree will affect perception of and response to all the rest.

Just as enrollment needs, educational program, cost, time, and physical environmental program are all interrelated in the total planning of a facility, too, the spatial, visual, thermal, acoustical, and aesthetic components of the physical environment must also be coordinated into a balanced scheme.

For example, the selection of a heating system, which must be concerned with the quantity of heat supplied and the responsiveness of the system to conditions in a given area, should take into account diverse factors such as the volume of the space to be treated, locations of partitions and dividers, occupancy levels and activities for which the space will be used, the orientation of the space with respect to the sun, the amount, type, and location of glazing, artificial lighting, electrical or other heat-producing equipment, and characteristics of materials, construction, and fittings generally. The location of the heating system with respect to the other activities in the building and the noise it generates throughout the environment are also factors. Intelligent environmental planning must attend to variables such as these.

From a strict planning point of view the form of the

physical environment should follow the functions of the educational program. As a description, however, of past practice and as an ideal, this notion has problems. In the previous section it has been noted that educational philosophy and space planning are too rarely viewed by administrators as interacting factors. Regarding past practice one educational facilities planner remarked:

> It's odd that the setting for education should invariably be dull. The long sterile halls, the repetitive classrooms, the unyielding and antiseptic surfaces, the drab furnishings, all make a strange setting for an institution the mission of which is to stimulate the mind, expand the senses and communicate the values of a dynamic society.[1]

It often appears that past practices in designing educational facilities are unquestioningly replicated, and thus are the prevailing factor in determining the educational program. To the extent that the educational program has been insufficiently considered in the planning of school buildings, as noted earlier, so too the physical environment has often been taken for granted and left to the architect. Architects, however, are not educators and basically are bound by the directions of their clients. Consequently, when the architect's imagination exceeds that of the educators, there results a disconnect: due to lack of communication in the planning process the building can prove unsatisfactory to its users.

As an ideal for the physical environment, the notion

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[1]Jonathan King, "Ding, Dong, Dull," Architectural Design, May 1968, p. 204.

that form follows function is somewhat problematic when applied to education. Educational needs often conflict as they grow more diverse in some respects and more specialized in others. With new approaches and forms of education - e.g., team teaching, non-grading, open space, home base and various interest area organizations - a main theme that emerges in the demand for educational facilities is flexibility. These schools of thought view education as a dynamic process that should be responsive to new discoveries, evolving trends, and changing class and individual needs. Such diversity and even uncertainty about future needs call for physical environmental specifications which will allow total flexibility for all contingencies. Systems of movable walls, adjustable lighting, multi-vent air circulation, portable furnishings, relocatable electric outlets and fixtures are now common. In this regard it is to be noted, however, that multi-purpose spaces, such as cafetoriums, have generally proved in practice to be unsatisfactory; once set up for one purpose they remain fixed or else are rarely used at all.

The paradox that flexibility has its own limitations is complicated by the demands of another educational trend: increased specialization. As a rule, the more specialized the activity, the more demanding its environmental requirements and, in turn, the less flexible and adaptable is the facility for other uses. Numerous vocational education programs, which emphasize replication of actual work environments, programs for the handicapped and the mentally retarded, and

instructional experiments utilizing extensive audio-visual media, studios, and other special equipment will require fairly controlled physical environmental standards which are not easily modifiable for other tasks. Flexibility and specialization are often not compatible.

Paralleling but quite separate from the divergent arguments for flexibility and specialization are two current movements in education, one advocating open-ended, informal, free educational processes, and the other advocating minimum performance standards, measurable accountability, and individual pacing towards these specific goals. The former assumes and is based on student diversity and individuality and aims towards personal independence; the latter assumes certain minimum needs common to all individuals in this society and aims towards minimum competence. Most educators attempt to steer a middle course by combining elements of both of these approaches.

Such divergencies in philosophic approaches to education - when hypothetically polarized for the purposes of this discussion - can also be seen in the disparate views of another aspect of planning the physical environment of school facilities. One approach advocates interaction of users with the environment and assumes that a degree of awareness and adaptation by the user to the environment is both inevitable and desirable; the other advocates an optimum, technologically controlled environment, permitting uninterrupted attention to a given task or activity.

According to the former view, the most important educational values are creativity and discovery, for which the environment should be an active stimulus. It is contended that a high level of interest and involvement can overcome most environmental distractions. To the extent that any environment is completely supportive or comfortable it hinders physical awareness and individual growth and, as with technological advancements, can lead to the atrophy of innate human functions.[1] Ultimately, the influences on human activity of any configuration of environmental variables are only partially predictable at best, involving numerous unforeseeable consequences.

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[1]The influence on society of technological development has been discussed by various essayists. Marshall McCluhan, the cybernetic eclectic, in proclaiming that the "media is the message," goes on to define the message of media in terms of previous human functions which are modified by media. Thus, for example, he argues that television taught us a new way of seeing, in a steady sequence of random, discontinuous images; but in the process subsequent generations are forgetting how to read (in the most fundamental sense of reading as a mode of human communication) and how to follow a linear, logical train of thought.

The dilemma of advancing technologies has also been eloquently stated by Ralph Waldo Emerson:

> The civilized man has built a coach, but has lost the use of his feet. He is supported on crutches, but lacks so much support of muscle. He has a fine Geneva watch, but he fails of the skill to tell the hour by the sun. A Greenwich nautical almanac he has, and so being sure of the information when he wants it, the man in the street does not know a star in the sky. The solstice he does not observe; the equinox he knows as little; and the whole bright calendar of the year is without a dial in his mind. His note-books impair his memory; his libraries overload his wit; the insurance office increases the number of acci-

In the latter approach the less obtrusive the physical environment the better, for the more complete can be the concentration on the task. More sophisticated technologies are seen as the key to this end and to greater human accomplishment in general. As we learn more about human behavior and develop more sophisticated methods and mechanical devices, it will be possible to formulate and achieve more precise objectives.

In their extreme theoretical forms both approaches have limitations from which they move towards a common ground in practice. The adaptionist believes that a high level of interest, involvement, and commitment to a task can overcome the shortcomings of most physical environments; yet it must be conceded that even a very high level of interest cannot overcome extreme and unhealthful conditions such as intense temperatures, stagnant air, or continuous loud noise. The follower of the technological, or behaviorist approach, on the other hand, in seeking "optimal" conditions, has tended to design for single measurable circumstances; uniformity and blandness often result. For example, previous research on

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dents; and it may be a question whether machinery does not encumber; whether we have not lost by refinement some energy, by a Christianity, entrenched in establishments and forms, some vigor of wild virtue. For every Stoic was a Stoic, but in Christiandom where is the Christian? ("Self-Reliance," Emerson on Education: Selections, ed. Howard Mumford Jones (New York: Teachers College Press, 1966 , pp. 129-30).

lighting standards has led to the recommendation of indirect, continuous, even lighting systems, bright, even contrast, and minimum glare. Dark areas and spotlighting for other than very specific purposes are viewed negatively as distracting or inhibiting for most teaching/learning tasks. More recent research, however, indicates that a certain amount of stress is preferable to no sensory stimulation; the body can become overloaded from too little stimulation as well as from too much.

> Prolonged exposure to a monotonous environment, then, has definitely deleterious effects. The individual's thinking is impaired: he shows childish emotional responses; his visual perception becomes disturbed; he suffers from hallucination; his brain-pattern changes...a changing sensory environment seems essential for human beings. Without it, the brain ceases to function in an adequate way, and abnormalities of behavior develop. In fact... 'variety is not the spice of life: it is the very stuff of it.'[1]

The middle ground in this controversy combines elements of diversity and stress, to which the human organism must adapt, with minimum environmental conditions of health and comfort.

> ...man acts upon his environment as well as being acted upon by it. Conscious attempts at manipulating it are at least as old as man himself: and the cumulative result of such attempts, especially in recent times, has been to give modern man a much wider knowledge and control over it than ever before.[2]

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[1]Heron Woodburn, "The Pathology of Boredom." Quoted in James Marston Fitch, "The Future of Architecture," The Journal of Aesthetic Education 4 (January 1970): 95.

[2]Fitch, op. cit., 86.

The distinctions and implications of these two epistemological/perceptual approaches are quite apparent when applied to the conversion of found space. A follower of the adaptionist approach would be more inclined to accept the physical conditions and limitations of the found building and hopefully through conscientious improvisation on the environment and adjustment to the educational program would arrive at a hybrid new identity - both environmentally and educationally. Participation in the planning process would necessarily be intense. The other approach would lead to remodeling the building to meet the requirements of a strictly preconceived program.

With the previous discussion as background, the question can be asked: which philosophic approach has been dominant in the practical experiences of found space educational and environmental programming? It should be emphasized that, regardless of bias or approach, a thorough consideration of physical environmental factors is fundamental in the planning of any educational facility. The science of physical environments is complex and should not be taken for granted by the layperson. Professional assistance should be sought for this aspect of facilities planning. Deliberations over the issues presented in this section may help clarify objectives and preferences and direct the planning efforts.

Costs

With school budgets tightening, the question of cost assumes a larger part in educational issues. School building costs, the second highest category of educational expenditure

next to teacher salaries, tend to attract a disproportionate amount of attention. Although constituting less than 10 percent of total educational expenditures,[1] these costs are highly visible due to the fact that school construction bonds are issued in such large sums, are directly translatable into tax impact, and are in most cases subject to voter approval. Consequently, the cost question has become an especially sensitive issue, one certain to influence decisions made about found space.

Spiraling inflation, particularly in construction costs but also in every other aspect of school building expenditures, has further exacerbated the budgetary problem. The pattern in New York State is typical of most other states: construction costs, site costs, operations and maintenance costs, and property tax rates - which, aside from constituent disgruntlement represents income lost to a municipality once a school building is placed on an income-producing site - are all rising faster than state aid. State building aid allowances, the only cost factor countering the other building costs, have not increased at a proportionate rate. Let us examine each of these cost components as it influences larger decisions.

School Building Construction Costs

A recent study indicates that educational buildings are among the most expensive types of structures as measured by value per square foot of floor area.[2] Furthermore, the valu-

[1]The Fleischmann Report, V. 2, p. 104.

[2]Jonah Otelsberg, "Trends in Valuation Per Square Foot

ation per square foot of educational buildings is increasing more rapidly than most other structural types, increasing by 39 percent or an annual average of 8.6 percent between 1967 and 1971.[1] The annual inflation for all construction during the same period rose by only 7.0 percent.[2] It appears that structural types that are less standardized and therefore more dependent on labor-intensive methods, such as education buildings, hospitals, and other public and institutional buildings, are the ones that have shown the highest rate of cost increase.

The trends in school building costs in New York State have basically followed the national ones. As indicated by table 1 the annual increase in school construction costs in non-Big City school districts in New York State was 8.5 percent during the period between 1966-1971. The trend for New York City has been similar but much more pronounced, with an average annual cost increase of 16.5 percent.[3] In subsequent years the rate of inflation in the state has declined - as

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of Building Floor Area, 1947-71," Construction Review, July 1972, pp. 4-10.

[1] Ibid. In the period 1967-71 only hospital and public buildings showed a higher rate of increase than educational buildings. During the period 1957-67 the increase in the valuation per square foot of educational buildings was the highest of all structural types.

[2] Department of Commerce Composit Cost Index 1953-1972, Construction Review, July 1973, p. 2.

[3] There is insufficient data on the other Big Cities in New York State to discern new school cost trends. Indeed, during the six-year period less than a dozen new schools have been built in the other five Big Cities (including Albany).

has the rate for the national construction industry, which peaked in 1972 - and, in fact, in 1973 the actual cost of schools in the non-Big City districts also declined. Consequently the average annual cost increase between 1966 and 1973 for upstate school districts was only 6.4 percent and for New York City, 13.5 percent. This fact seems to be a reflection of several factors: tight budgets and consequent efforts by school districts and the State Education Department to eliminate frills and keep costs at a minimum; a relative decrease in per pupil cost allowances for state building aid purposes, further exacerbating the budget considerations; and the aforementioned decline in the inflation rate.[1]

This recent decline in cost trends is probably only temporary, part of a larger economic cycle of peaks and slumps. In fact, cost estimators are predicting that the winding down of inflation in the construction industry from a peak in 1971 has come to an end.[2] At present and in the immediate future rising material prices related to the omnipresent energy crisis are the principal pressures pushing up construction costs.[3] Though it is probably only a short-term advantage (since other construction cost components such as labor, equipment, and money are bound to rise also) the implication for more labor-

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[1]Just to complete the circle, the decline in inflation rates is, in part, a function of the reduced new construction, which results from the tighter financial situation.

[2]"Cost Estimators See Materials as the Biggest Headache in '74," Engineering News Record, September 20, 1973, pp. 64-6.

[3]Ibid.

TABLE 1

TRENDS IN EDUCATION BUILDING COSTS

(Based on Square Foot Costs Exclusive of Site Costs, Fees, and Other Incidentals)

Year	National		New York State			
	Educational Buildings		Non-Big City Districts		New York City	
	Cost Index	Increase Over Prior Year	Square Foot Cost	Increase Over Prior Year	Square Foot Cost	Increase Over Prior Year
1966	NA	...	$18.71	...	...	...
1967	100		20.66	10.4%	$26.94	...
1968	106	6.0%	19.99	-3.2	29.30	8.8%
1969	116	9.4	23.14	15.8	38.23	30.5
1970	125	7.75	24.66	6.6	52.13	36.4
1971	139	11.2	27.80	12.7	47.13	-9.6
1972	NA	...	28.66	3.1	50.00	6.1
1973	NA	...	28.39	-.9	54.52	9.0
Annual Averages						
1969-1971		8.6	...	8.5	...	16.5
1966-1973		...	...	6.4	...	13.5

SOURCES:

U.S. Department of Commerce, Construction Review, July 1972.

N.Y.S. Education Department, Division of Education Facilities Planning, Semi-Annual Cost Report and Statistical Data, Summary of Costs per Square Foot, Albany, N.Y., March 1966-Sept. 1973.

N.Y.C. Board of Education, Office of School Buildings, "School Construction Costs," updated through August 1973.

intensive found space renovation is advantageous relative to the more materials-intensive new school construction.

From table 1 it is clear that school construction costs in New York City are much higher than in the rest of the state, running nearly twice as high in 1973. This cost disparity is a cause of considerable concern, for it is not clear in the case of New York City how much can be done about it. Wage rates are about the highest in the nation, working conditions are exceedingly difficult (as in the storage and logistics of materials and equipment), N.Y.C. Board of Education building standards tend to be quite high (in part a reflection of the codes and the exigencies of this unique urban situation), and the huge New York City bureaucracy tends to be a sluggish and difficult client for private contractors to deal with in terms of on-time payments, approvals, etc. All of these facts are reflected in higher construction costs.

New York State is not unique; a survey in Massachusetts, for example, besides finding that state's school construction costs to be the highest in the region (which includes New York State) also indicated that urban schools averaged about 20 percent higher than suburban ones.[1]

For complete tables of annual school construction costs, both per square foot and per pupil, see appendix B-15 and B-16.

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[1] A Systems Approach for Massachusetts Schools, a study for MACE, by Campbell, Aldrich, and Nulty, *et al.*, Boston, 1972, (hereinafter cited as MACE study). See appendix B-17 for a table of Massachusetts school building costs.

Site Costs

Another large component of school building costs is the site cost. Once again the disparities in cost between urban and suburban localities are astonishing with New York City, as usual, in a class by itself. Table 2 shows the stark differences in site costs between the Big Cities and other districts in New York State for the period 1964-1969. More recent site cost data for New York City and the non-Big City school districts in New York State indicate a still more exacerbated disparity: between 1969 and 1972 the average cost per acre in New York City rose to $315,600 as compared to $5721 for the suburban districts. For the suburban districts this represents an increase of over 200 percent during this period as compared to only a 43 percent increase for New York City. For New York City, however, this amounts to an average annual increase of $39,800 an acre, over 13 percent a year.[2] Putting it another way, statistically this represents a cost per pupil of $565 for site acquisition in 1972. For more complete tables of New York City and New York State site costs see appendix B.[3]

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[1]Based on NYSED, DEFP, Semi-Annual School Cost Reports and Statistical Data, March 1966-September 1973 and data provided by the New York City Board of Education, Bureau of School Financial Aid.

[2]Derived by linear regression analysis of New York City School site costs for the years 1965-66 through 1971-72; based on data provided by the Bureau of School Financial Aid, New York City Board of Education.

[3]See tables 18 and 19 in appendix B.

TABLE 2

COMPARISON OF SCHOOL SITE COSTS FOR BIG CITIES AND OTHER LOCALITIES IN NEW YORK STATE: 1964-65 to 1968-69

City	Average Site Cost per Acre
Albany	...
Buffalo	$ 38,886
New York City	220,845
Rochester	
Syracuse	26,739
Yonkers	120,063
Other Districts in New York State excluding Big 6	1,800

SOURCE: Bureau of Educational Plant Planning, NYSED; cited in An Identification of the Critical Educational and Financial Needs Existing in Large City School Districts in New York State with Recommendations for Legislative Action, Conference of Large City Boards of Education of New York State, October 1970, p. 19.

Property Taxes

Taxes generated by land and buildings are generally viewed as the major source of annual revenue for all school and other municipal expenditures. In the case of school buildings, however, property tax can be figured as a direct annual cost in addition to the acquisition cost of land. Property owned by a school district or municipality is removed from the tax roles and that amount of revenue must be made up by

higher tax assessments. Therefore, in assessing the cost attributable to a specific school building, the potential tax income-producing power of the property if used for private taxable purposes may be added as a direct cost to the municipality or school district.

Like site and construction costs, property taxes have also been increasing fairly steadily. The amount of school property taxes collected in New York State between 1960 and 1971 increased by 173 percent, an average increase of 15.7 percent a year.[1] This amount includes buildings newly added to the tax roles. The impact on specific buildings of property tax increases (a function of reassessments and changes in the tax rate) has nevertheless also been significant, although varying considerably from place to place.[2]

Operations and Maintenance

Building operation and maintenance (O and M) costs represent the most significant yet least monitored component of a building's lifetime costs. Based on projections in this study it appears that O and M accounts for nearly two-thirds of the value of a typical school building over a fifty-year lifetime. Nevertheless, in contrast to initial acquisition and construction costs, little public or official attention is focused on O and M costs or their relationship to initial investments.

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[1]The Fleischmann Report, V. 1, p. 77.

[2]In New York City, for example, between 1968 and 1974 the basic tax rate has increased by an annual average of 6.45 percent while assessments have theoretically remained constant. (Based on information supplied by the City Collector's Office.)

This is true despite the fact that in recent years O and M cost inflation has grown more rapidly than ever, exacerbated particularly by the current energy problems, material shortages, and labor cost increases.[1] Of school management areas in need of further study and more comprehensive and systematic data collection, surely this one ranks high. Operation and maintenance of school facilities, while not the subject of this study, was examined in connection with found space conversion. A dearth of records was found regarding the cost and nature of operations and maintenance.

State Aid

In New York State, as in most other states, building aid is apportioned on the basis of acquisition expenses only: construction, site, furnishings, and fees. Annual O and M costs are normally reimbursed, if at all, through state operations aid.

In New York State increases in the cost allowance for new school buildings have not kept pace with increases in construction and site costs. Examining construction costs only shows that while school building costs between 1966 and 1973 increased an annual average of 6.4 percent in suburban districts and 13.5 percent in New York City, the schedule of cost allowances averaged an annual increase of only 5.9 percent (see appendix B-20).

[1]Spot checks on O and M annual cost inflation (e.g., Columbia University, Teachers College and New York City building management agents) show budget increases of about 10 percent in recent years and great uncertainty mixed with expectations of higher rates for the near future.

Given these new building cost realities, particularly in cities and other areas of high land values, there is much reason for concern. Measures that result in economies and/or less expensive alternatives deserve attention. This is another context in which found space conversion can be seen as a viable alternative.

Financing Considerations

Leasing of found space offers a potential solution to certain financing problems faced by school districts, aside from cost. Renting buildings can be an alternative to four common problems: overturned bond referendums; insufficient debt margins; interagency competition for scarce capital funds, in cities especially; and temporary educational space needs. Various inflationary pressures have led to voter intransigence and resistance to higher taxes and unapproved new school building bonds.[1] In many places the rental of space paid for out of operations budgets rather than long-term debt has offered a means of juggling funds to get around such problems. This flexibility is no longer available to New York State non-city school districts; as of July 1973 leased space must also

[1]According to a U.S. Office of Education, Department of Health, Education and Welfare circular entitled "Bond Sales for Public School Purposes," the number of school bond issues approved by the voters dropped 18 percent from 74.7 percent to 56.8 percent in the four-year period from 1964-5 to 1968-9; the percent approved based on dollar value dropped 36 percent during the same period, from 79.4 percent approved to 43.6 percent.

be approved by the voters in non-city school districts.[1] In other places, however, leasing remains a viable method.

Renting can provide an alternative to school districts which cannot legally issue debt to build a new school without exceeding their statutory debt limit. Ironically, this situation frequently arises in rapidly growing new communities which have lots of school-age children but lack the substructure of high income-producing commercial and industrial properties - the kind of older buildings, that is, which might be available for conversion to schools. Thus found space rental often cannot be considered by many of the communities for whom it might be most useful.

Debt ceilings pose special problems for large cities in which various city departments compete for scarce capital funds. In addition, the obligation of cities to provide a broad range of services to a population extending beyond its own borders contributes to the phenomenon of "municipal overburden," - a tax revenue problem resulting from high population density and a high percentage of low-income residents - further depleting resources available to schools.

This is not to argue that leasing found space is cheaper than either purchase and conversion of an existing building or building a new building. In actual fact, renting is usually, though not necessarily, more expensive over the long

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[1]The provision, part of Section 1726 of the Education Law, was designed to control abuses in the lease and lease-purchase of manufactured, so-called "portable" classrooms, not for found space, to which it also applies. (See page 83.)

term.[1] Rather, it is under extreme or emergency circumstances that rental can provide a way of juggling funds and circumventing barriers when other means of acquiring space are not available. Cost, of course, is not the only factor to be considered in decisions on acquiring space either for the long or short term.

Finally, it is self-evident that leasing is fiscally more sensible than new building for emergency space needs, projected short-term enrollment peaks, or temporary funded programs.

Time

The difficulty in accurately predicting enrollment needs and the fact that construction and land costs have escalated so rapidly make time a particularly sensitive factor in the planning of school facilities. Typically a new school building takes from two and a half to four years to plan and build in suburban school districts and much longer in cities - usually from six to ten years in New York City.

From the cost point of view, time means money; any delay increases the cost of a building project. Regarding projections of enrollment needs there is little leeway for misjudgment, particularly in the context of a commitment to a new building - a major endeavor which is difficult to begin, and irreversible once complete.

Found space conversion, on the other hand, promises greater flexibility. Advocates argue that it is faster than

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[1] See pages 163-170.

constructing a new school building and is thus a more flexible solution to unexpected enrollment growth; in addition, found space is more easily disposable when no longer needed, as in the cases of temporary programs or enrollment declines. It would seem, after all, that a building which can be converted to a school can just as easily be reconverted to its original or other uses.

Indirect, Intangible, and Social Cost Considerations

The cost of new buildings, particularly in urban areas, frequently extends beyond the price of site purchase and building construction: property condemnation, tenant relocation, and building demolition are three aspects of the new building acquisition process that bear indirect as well as outright costs. There are direct costs for legal fees, resettlement allotments, and demolition contracts, respectively. Often still more costly - in the highly inflationary construction industry where time means money - are the long delays entailed in court suits, squatter battles and relocation negotiations.

Just as important as the dollar costs are the effects on the people in a neighborhood when relocation is involved. The resultant resentment can leave deep scars.[1] Experience also seems to indicate that while people like the idea of a

[1]Examples are numerous, but one should suffice. The New York City Board of Education, in the early 1970s, met terrific local resistance in the Corona section of Queens when it attempted to condemn and relocate some 40 houses

new neighborhood school they resist its construction next to their own property, apparently because they feel that children are noisy and intrusive.

Found space conversion avoids condemnation, dislocation, and resultant neighborhood resentment and also avoids battling and paying the price for scarce unencumbered sites in high-density urban areas. Meanwhile found space schools can still provide the advantages of proximity and neighborhood access.

Even stronger, though more intangible, is the value of found space as a force for neighborhood preservation and revitalization. That vacant and boarded up-buildings decay and have a blighting influence on neighborhoods is, by now, a fact of urban and regional planning. In that light a school board which converts an existing building to a school acts to eliminate decay and can introduce a revitalizing force to the neighborhood. Although the evidence is spotty and subjective, some of the schools visited during the course of this study appear to reinforce such arguments.

One problem now being faced in many older suburbs throughout the country is the negative influence on a community of school closings and boarded-up school buildings. It is disturbing to the extent that the community took symbolic

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for an athletic field for the planned "New Queens H.S." Battle lines were drawn and compromises attempted; the result is that three years later construction for the school has still not begun. (Incidently, though not entirely coincidently, the Board of Education's policy has since changed to building small, so-called "mini-schools" which can fit on small sites without necessitating relocation.)

pride in the school as a community institution. Many of these are communities which were developed in the early decades of this century, whose children have since grown up and moved out to newer suburbs while the parents have stayed behind.[1] In spite of population and enrollment declines, rising costs, taxes, and overturned school budgets, such communities have vehemently resisted local school closings.[2] Given the contradictory attitudinal patterns indicated by overturned budgets and unwillingness to close schools for economy's sake, it is almost as if a local school closing symbolizes a declining old age which the community is unwilling to acknowledge. Since school buildings are not well suited for conversion to other uses, with some exceptions most of them remain vacant - signs of failure or error.

It is clear that building a new school has not always had a long-term sanguinary effect on its community. Many immeasurable factors which profoundly affect the quality of life in society point to found space as a possible choice over new buildings in the future.

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[1]Many of the older school districts in the so-called "inner ring" of the New York City metropolitan area exemplify the phenomenon. Plainview-Old Bethpage in Nassau County, and Huntington and Commack in western Suffolk County are among the school districts which have closed schools. "In Suburbs Grown Older, Schools Grow Silent," New York Times, 17 February 1974, Sec. 5, p.8.

[2]When the East Meadow school district, in Nassau County, L.I., closed a school building in June 1973, parents sued, unsuccessfully, to try to keep it open. Ibid.

Summary

This chapter presents a review of crucial issues which a comprehensive study of school facilities planning should acknowledge, and it also raises questions in found space which the research component of this study attempts to inform. Not coincidentally, therefore, the discussions of these issues begin to lay a framework and define categories of information for planning found space conversion. In this regard it may also serve as a guide to decision-makers.

CHAPTER II

METHODOLOGY

The methodology followed in this study can perhaps be characterized by a line from a play by Edward Albee: "Sometimes a person has to go a very long distance out of his way to come back a short distance correctly."[1] The conclusions reached in this study, though not always surprising, could only be given validity and perspective through a thorough investigation - which might be seen as taking a long trip to a near goal.

This study is an exploration of educational facilities planning issues as they relate to the conversion of found space. From the beginning a dialectic evolved between original intentions of the study and the investigation that followed, out of which issue areas gradually were brought into focus.

The intent of this study has been broad and ambitious: to investigate cases of found space conversion with a view to determining the applicability, limitations, and complications of found space as a method of school space acquisition for elementary and secondary education; and out of the investigations to establish a framework for planning

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[1]Edward Albee, The Zoo Story (New York: New American Library, Signet Books, 1963), p. 21.

and evaluating this alternative in specific situations. Various aspects pertinent to school facilities were explored, including background rationale, cost and financing, educational programs and innovations, architectural considerations (physical environment and building codes), legal issues, time factors, and advantages and disadvantages of facilities as perceived by their users.

There is little in the way of literature or studies to provide insight into the problems of found space, a framework for studying or evaluating school facilities,[1] or a conceptual basis of any other kind for approaching this topic. Consequently case studies on actual schools in recycled buildings, including school visits, interviews, and examination of files, provided the primary source of information for this study. Short of undertaking action research, in which the actual conversion of a non-school building to a school would be undertaken and would comprise the substance of the study, the case study approach promised to provide the

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[1] Guide for Planning Educational Facilities, the Council of Educational Facility Planners (Columbus, Ohio, 1969) is one of the best general discussions of the various topics involved in planning a new school building but is weak on specifics and not so useful for evaluation of existing buildings. The Chicago Board of Education's component of project Simu-School recently published MEEB: Model for the Evaluation of Educational Buildings, Professor Carroll W. McGuffey (Chicago, Simu-School, 1974), however the evaluative tools proposed by this study relate to building utilization and physical environments only and, what's more, are of limited usefulness because they are conceived in terms of traditional educational programs only.

most immediate insight into found space conversion problems and additionally to provide a broader view of the issues than would a single project.

Laws, state administrative practices, current planning considerations, building codes, and various other issues were investigated independently of the issues examined in the school visits, through study of agency operations and pertinent reference manuals.

The research was deliberately designed with wide rather than narrow topical dimensions in order to allow as broad an exploration as possible of this relatively new school facility alternative. The prospects of attaining specific, clear, and definitive conclusions by strictly delimiting the area of investigation were minimized so that the leeway to explore freely might be maximal.

In actuality, the course of the research led in unanticipated directions, including three times the number of school visits originally planned, and, most notably, leading to the designing and writing of a computer program to analyze the lifetime cost of school facility alternatives.

The subsections which follow describe in greater detail the methodology of the case studies, and then the investigative rationale of this study. Areas of inquiry and investigative procedures are discussed separately in relation to each topic.

Case Studies

It was initially planned to base the study on 10 to 12 cases, but the number of found space schools visited grew to nearly 40. Later the cases were limited to public schools on the assumption that private schools face fewer constraints than those run by public boards of education and that the solutions to problems reached by public schools would be easier to accomplish in the private domain.

Each of the case studies is based on field visits, building inspections, extensive interviews and examinations of plans, records, cost sheets, and other documents. Topics investigated in each case included: the background and local context of the decision to convert the building; the time involved and process followed in building acquisition and renovation; the educational program in operation; educational performance indicators such as achievement scores, attendance rates, vandalism, etc.; the environmental characteristics of the recycled building; costs; financing method; and perceived advantages and disadvantages of the converted building. This information was obtained through personal observations with checklists (see appendix A) and interviews with people connected with the inception, planning, conversion, and use of the found space including central school board officials, architects, school principals, teachers, students, parents, and custodians.

Finally, the study and the cases are focused on New York State although it is hoped that its applicability will reach a much broader audience. Each state and state education department has formulated its own set of laws and administrative regulations governing school building. Grounding the study on state-specific rules and procedures is necessary for consistent analysis. In addition, New York was logistically convenient. Nevertheless, as was mentioned earlier, found space schools and procedures in other states, namely Massachusetts and Pennsylvania, were also studied in order to place New York State's experience and procedures in a larger perspective.

The initial selection of found space schools to visit was based mainly on considerations of diversity: a desire to investigate the adequacy of found space in a broad range of circumstances. School grade levels, educational programs, found building types, locations, and approaches to renovation and financing are among the characteristics in which diversity was sought. Subsequently the desire to investigate various approaches in one particular category - taking building types, such as bowling alleys as an example - influenced school selections.

The field visits included schools in three states - New York, Massachusetts, and Pennsylvania - and the majority (33) of the schools were in three cities, over half (20) in New York City alone. The intensive urban focus of these school visits was not intended; attempts to discover more

suburban and rural cases simply did not pay off until after the field work phase of the research had ended. The lack of data that initially seemed to prove that found space recycling worked primarily for cities now appears rather to indicate a lack of attention to this category of school facility in centralized records (such as those at state education departments). Information on found space conversion in the three major cities is centralized and consequently much more accessible than attempting to contact outlying districts individually.

Found Buildings as Educational Facilities

This section lists the various issues pertaining to school facilities and educational programs in terms of the procedures by which they were investigated. Although inter-related in practice, for clarity's sake these issues are here outlined separately, grouped under the following headings: educational program issues, environmental issues, building code factors, and educational performance relations. The investigations of these issues by and large do not lead to comprehensive and specific or validated conclusions, but rather to general discussions of findings.

Educational Program Issues

Areas Investigated

- Suitability of specific building types for different educational programs, and conversely, desired building

characteristics for varied educational program needs.

- Influence of built-in limitations and physical constraints of unconventional found spaces on educational forms and programs; more precisely, how such physical constraints are overcome or adapted to, or how they influence total program reconsiderations.

Inquiry Procedures and Information Sources

- School visits, observations, and interviews with administrators, teachers, students, and parents.

Physical Environment Issues

Physical environments can be characterized as affecting educational programs and human comfort through five interrelated components: visual, thermal, spatial, acoustical, and aesthetic. The last of these, the aesthetic, in itself can be described as a composite of the other four. Focusing on these environmental components provided the basis for examining the following issues.

Areas Investigated

- Suitability of physical environmental systems of found buildings for educational programs; more specifically, the assets and problems of physical environments in selected found space schools; the qualities of environmental systems in found building types labeled "as is" - that is, in found condition - and problems in conversion.

- Influence of built-in limitations and physical

constraints of unconventional found buildings on design programs for modifying the physical environment; more precisely, how such physical constraints are modified, adapted to, or influence total program considerations.

- The nature of the planning process, participation, and organizational relationships between educational and physical environment programs and the influence of this factor on user satisfaction with converted buildings.

Inquiry Procedures and Information Sources

- School visits, observations, building surveys, (see forms included in appendix A), and interviews with custodians, architects, administrators, teachers, and students, and consultation of planning manuals.

Building Code Factors

All buildings must comply with various codes which are intended to assure the health, safety, and comfort of individuals engaged in specific activities. Different buildings and activities have different standards and requirements. Codes and standards for educational buildings, like other buildings, vary from place to place, but most codes have many common elements. Codes and standards, while ostensibly intended to assure quality in physical environments, tend to be written in item- and material-specific forms, unconnected to programs, and unconnected to performance.

Areas Investigated

- Specific building type characteristics and problems of compliance to standards required of school facilities.

Inquiry Procedures and Information Sources

- Interviews with architects and engineers, examination of building plans, and New York State and New York City code books and planning manuals.

Educational Performance Relations

The impact of the numerous factors which influence learning and other education objectives is an area of great concern but one that is poorly understood. The relative contribution of educational facilities to educational outcomes is generally assumed to be low compared to other inputs like teaching staff characteristics, personnel to student ratios, methods, materials, and the like. Nevertheless, information on educational outcomes in found space schools was sought for comparison to local district, city-wide, or other averages on the grounds that extreme variations from norms might be meaningful. Educational performance data and surrogates - such as test scores, attendance rates, dropout rates, rates on vandalism or drug abuse - were sought but unfortunately were rarely available in any form that would make possible comparison of these factors on a school-by-school basis.[1]

[1]Similar data aggregated by school building as well as by a larger reference unit was infrequently available. In this area, as in others, school recordkeeping for management purposes was found to be generally poor.

Process and Time

Various questions pertaining to the legal and participatory process by which found space schools are planned and acquired were investigated.

Areas Investigated

- The legal and administrative process by which found space schools are acquired in New York State generally and New York City in particular.

- Planning, construction, and total acquisition time of found space as compared to new school buildings.

- Participation of school personnel in the planning process and the significance of this factor on user satisfaction.

Inquiry Procedures and Information Sources

- Interviews with found space school personnel, staffs of central city school districts (Boston, Philadel ia, New York, etc.) and state agency officials; and exam .cion of files, reports, anu pertinent laws and other documents.

Cost and Financing

Various issues were investigated that pertain to the economics of found space, particularly as compared to the construction of new school buildings. Conventional methods for analyzing school building costs were found inadequate for the purposes of this study; therefore a new cost simulation model, which projects building lifetime costs, was designed.

Areas Investigated

The fundamental question examined was whether, or under what circumstances, found space conversion is financially a more advantageous alternative for municipalities than a new school building. Municipalities were selected as the level of analysis, rather than school districts or state or federal governments for two reasons: the impact on the local tax payer's dollar at the municipal level is most direct; and state aid, which is also an important influence on school district level decisions, is also present as a factor in the analysis of municipality costs.

The issue of cost advantage has two parts: short term and long term. For short-term space needs the crucial factor is the total cost of any facility that is available or usable for the length of the need. For space needs of long or indeterminate duration the more important factor becomes the comparable unit cost of alternative facilities - cost per pupil or cost per square foot, for example.

Regarding financing of alternative facilities, the availability and impact of state aid and the relative benefits of lease versus purchase are questions which are also examined.

Inquiry Procedures

Conventional methods of calculating the cost of school facilities generally take only initial acquisition costs into account: that is, site purchase, construction costs, fees, and state aid. Such calculations do not provide a valid basis for comparing buildings financed under different plans - such as

leasing, issuance of long-term debt, and outright cash expenditures - nor for comparing buildings with different life use expectancies. Also, such computations do not give a measure of the lifetime building value which includes significant other costs over a period of time, such as operation and maintenance costs.

For these reasons the conventional cost analysis method was inadequate for this study. A cost analytic framework was required which could take into account all the component school facility costs - including the effective acquisition costs (rental payments or purchase price, plus renovation costs), state aid reimbursements, property tax losses, and operation and maintenance costs - in order to derive equivalent measures of lifetime costs for different school facility alternatives.

Consequently a computer program was written which projects the lifetime cost, discounted to present value, of leased and/or purchased converted buildings, and/or new school buildings. The results of the computer simulation for each facility alternative analyzed include the total lifetime cost of the building to the municipality and annual present values per square foot and per pupil. For each found space case, costs were also projected for a comparable new school building and, when data were available, cost projections for the same facility were made under the other financing alternative; that is, if the found building was leased, the cost under purchase was estimated, and vice versa.

Within this study these costs are projected for alternative facilities for equivalent numbers of pupils. Theoretically and practically it is impossible to assume that found space and a new school are equivalent buildings (for this reason the other dimensions of school facility decisions (e.g., time, physical environment, etc.) are also examined in this study). Capacity was selected as the common denominator for comparison because that most nearly represents the need toward which the school facility decision is aimed.

Information Sources, Data Values, and Assumptions

General procedures followed in developing costs for the computer runs are described here. Because of the number of variables used in each data run (up to 46) and because of the sensitivity of the program, a great deal of attention was focused on objectivity and precision. Every effort was made to secure actual cost figures for all of the data items or figures on which to base trends in the case of rates of change. For example, the property tax rates were collected for a period of six years or more for each municipality in which a found space school was studied (with separate tax rates for each of New York City's boroughs and adjustments made for reassessments in Perkasie, Pa.), and on the basis of these values a change in tax rate constant was projected by linear regression analysis. Where actual values for other data items were not available they were generally projected on the basis of local, state, or national trends (again based on data availability and judgments as to which were the "best"-

i.e., most nearly accurate - figures). For example, operations and maintenance costs for the found space schools in Philadelphia were not available. In this case citywide averages were used. If there were insufficient actual cost data, the school was not analyzed.

Site purchase, construction costs, and O and M cost values for new school buildings against which the found space schools are compared were based entirely on averages and trends. Again great pains were taken both in gathering and analyzing school construction costs which cover a specific period of time in specific localities or regions. For New York State and New York City tables of average annual costs for school sites and new school construction, the latter subdivided by school levels (elementary, middle, and high school), were developed for the years 1966 to 1973.[1] When the extensive data needed to develop such tables were unavailable, average costs for the locality for a given year (as documented by board of education figures or a reliable study[2]) were adjusted for specific other years according to the national index of inflation in the construction industry.

The effort, in short, was to compare the found space school to a "typical" new school building of the same pupil capacity and for which contracts were signed at the same point in time. Square footage of found space schools and new school buildings, however, are not necessarily the same.

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[1]These tables are included in appendix B.

[2]For Massachusetts schools the MACE study was used.

Square footage for found space schools are actual figures; the size of the new building is a product of pupil capacity and an average figure per pupil, again based on state documents and local sources.

A complete description of data items, sources, and assumptions is included in appendix C. A more detailed description of the simulation model is included in the next chapter which describes the background rationale and the design of the computer program by which these cost data were analyzed.

CHAPTER III

SIMULATION MODEL FOR PROJECTING ALTERNATIVE SCHOOL FACILITY COSTS

Background: Need for a Program

The usual method of estimating school building costs is to sum the various components of the acquisition cost (including site cost, construction cost, and fees and reduce this total by expected state aid reimbursements. To provide a standard for comparison, the total is then divided to determine the unit cost per pupil or per square foot.

There are several shortcomings to this approach to capital cost analysis.

1. It does not give a sense of the lifetime cost of the building, or, in turn, a valid unit value to the school district or municipality. Initial capital outlay is not necessarily directly proportional to long-term cost. Indeed, in some cases the relationship may be inverse; that is, initial economies may result in a shorter building life, higher operations and maintenance costs, and thus greater long-term expense.
2. It does not account for the discounted value, due to inflation, of future expenditures of money.
3. Because of the first two problems, the costs of alternative buildings acquired under different financing arrangements - namely, lease versus debt finance - cannot validly be compared.

Such concerns are well known to the field of managerial finance, and formulae for deriving the present value of future expenditures are basic.

Overview of Program Rationale

Building on such capital investment concepts, a computer program has been written which projects the total cost and reduces to present-day dollars the lifetime cost of three school facility alternatives: a new school building; an existing non-school building, purchased and renovated for school use; and a rented "found" building, converted at the expense of either the landlord or the tenant (the school district) for school use. The program can also analyze, within the three alternatives, the still fairly rare instances in which existing school buildings are purchased or leased or a new building is purchased through a turnkey arrangement. The cost categories for these other space acquisition alternatives are not different from the ones built into the program.

In the program the three acquisition/financing alternatives are stacked, one after the other. Depending on data availability, any one or all three of the alternatives can be analyzed. Thus, using similar costing and programing concepts, it would be a relatively simple matter to add other school facility financing/construction alternatives to the program - such as joint occupancy development - if desired.

Input and Program Design

In costing out each alternative the following general categories of information are included:

- Initial acquisition cost. These include such factors as site cost or purchase of building, relocation and demolition costs, renovation or new building construction costs, and fees. For long-term debt financing interest rates, bond term, and debt service can be included. For leased buildings periodic rental payments and the cost of tenant-performed renovations must be known (or estimated).

- State aid reimbursements. State aid may be paid in an initial lump sum or in varying annual amounts, depending on different state reimbursement plans. The New York State building aid formula for the calculation of state aid is currently built into the program as a subroutine. It would be an easy matter to replace this subroutine with the building aid formula of another state.

- Annual taxes. The portion of rental payments on leased buildings which goes toward property tax payments is recovered by the municipality (or indirectly, the school district). New school buildings and purchased converted buildings, are, however, removed from the tax roles, and thus prior property tax payments represent annual income lost.

- Operations and maintenance costs. Like property taxes, O and M costs are inflating and recurrent annual costs for the lifetime of the building in each of the three alternatives. These costs are paid for (in some portion, at least, usually even in rented buildings) by the school users.

- Building life expectancy. The long-term cost of a building depends to a great extent on the length of its use. In the case of leased buildings, the life use is defined by the terms of the lease. In the case of the other alternatives the life use may be defined by the duration of the projected need, or by an appraisal of the building's durability under the anticipated use.

- Resale value. In the case of purchased non-school buildings particularly (but potentially for new school buildings also), it may be reasonable to estimate a residual market value for the building (especially in high-density urban areas) once the projected need for school space has passed.

- Square footage and/or pupil capacity. If pupil capacity is not known, it can be calculated from the square footage. Up to 46 separate data items, as currently designed, can be entered into the program.

For each cost category the present value is calculated. First year capital outlays by definition are the present value. A series of constant annual expenditures (such as debt service and annual rental payments) are discounted to the present value through the formula:

$$PV = PMT\left(\frac{1 - (1+i)^{-n}}{i}\right)$$

where PV is present value, PMT is the constant annual payment, i is the prevailing interest rate, and n is the number of years of the payment.

When a single expenditure (or income) amount is to be made in a future year (as in the renovation of a leased

building or resale income from an owned building) the present worth (or value) of that amount is found by the formula:

$$PV = \frac{S}{(1+i)n}$$

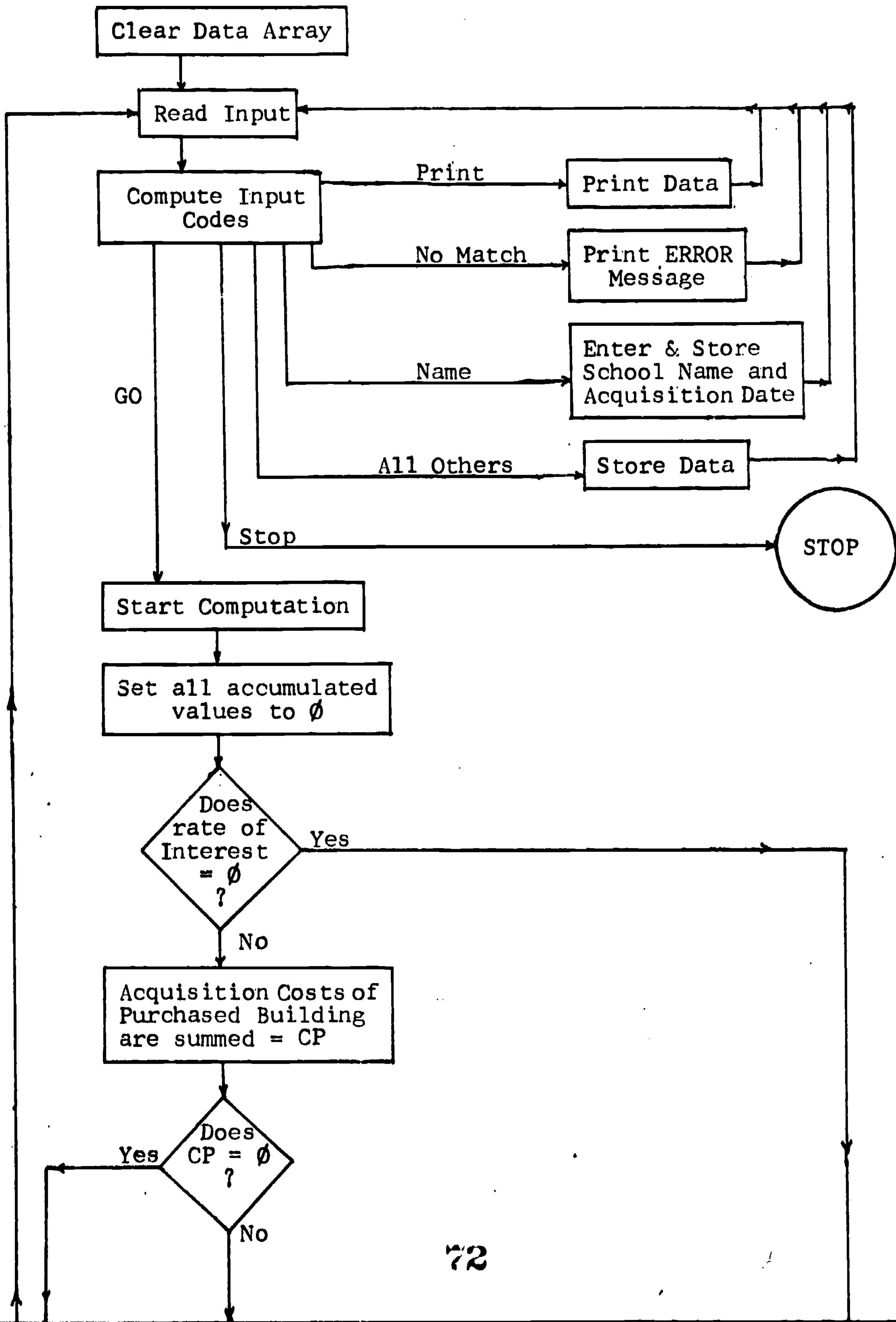
where S is the amount and n is the future year in which the payment is made.

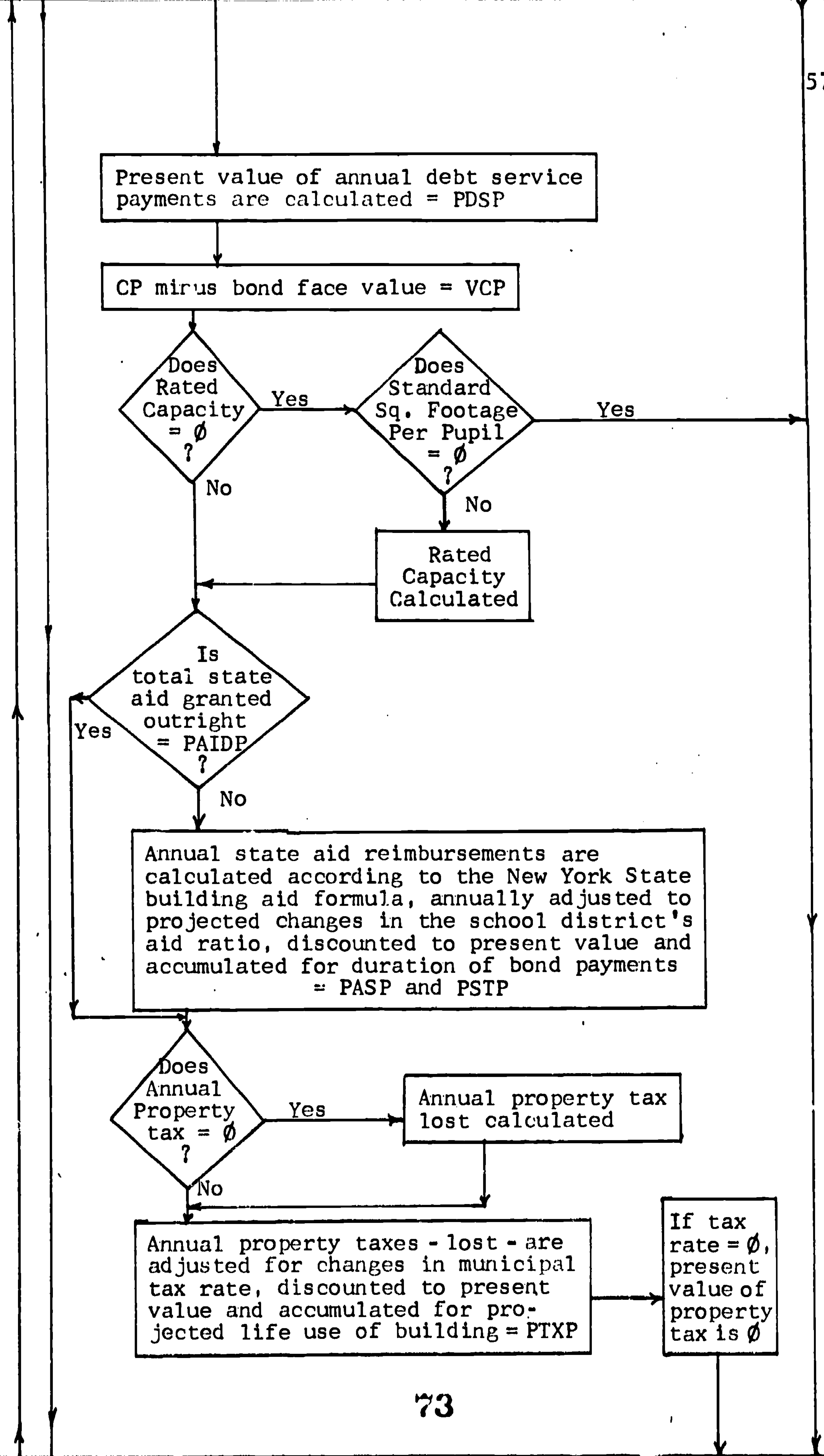
In those cases in which a series of changing annual payments are involved (state aid, taxes, and operations and maintenance), it is assumed that the annual increment of change is constant, based on past patterns, and the second (present worth) formula is used for each annual amount. More specifically, annual state aid reimbursements, in New York State at least, change according to the school district's aid ratio in any given year; property taxes vary according to annual changes in the tax rate; and O and M costs are assumed to increase by an annual factor which is empirically derived.

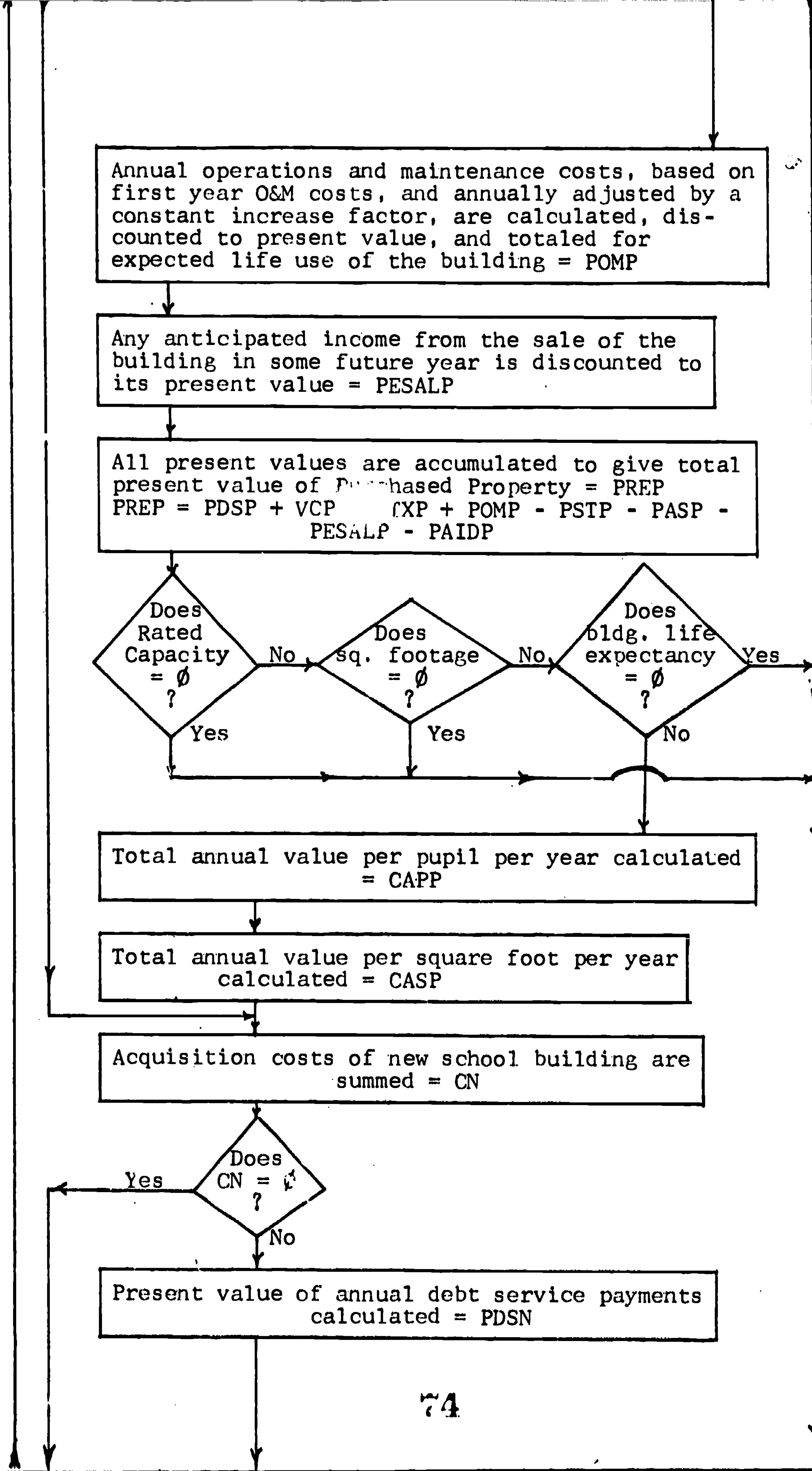
Finally, for each of the acquisition alternatives, all the present values are summed to obtain a total present value for each building alternative. This figure is then divided by the number of years of expected use, and then again divided, first by the pupil capacity and next by the total square footage, to obtain figures for the total annual present value per pupil, and the total annual present value per square foot.

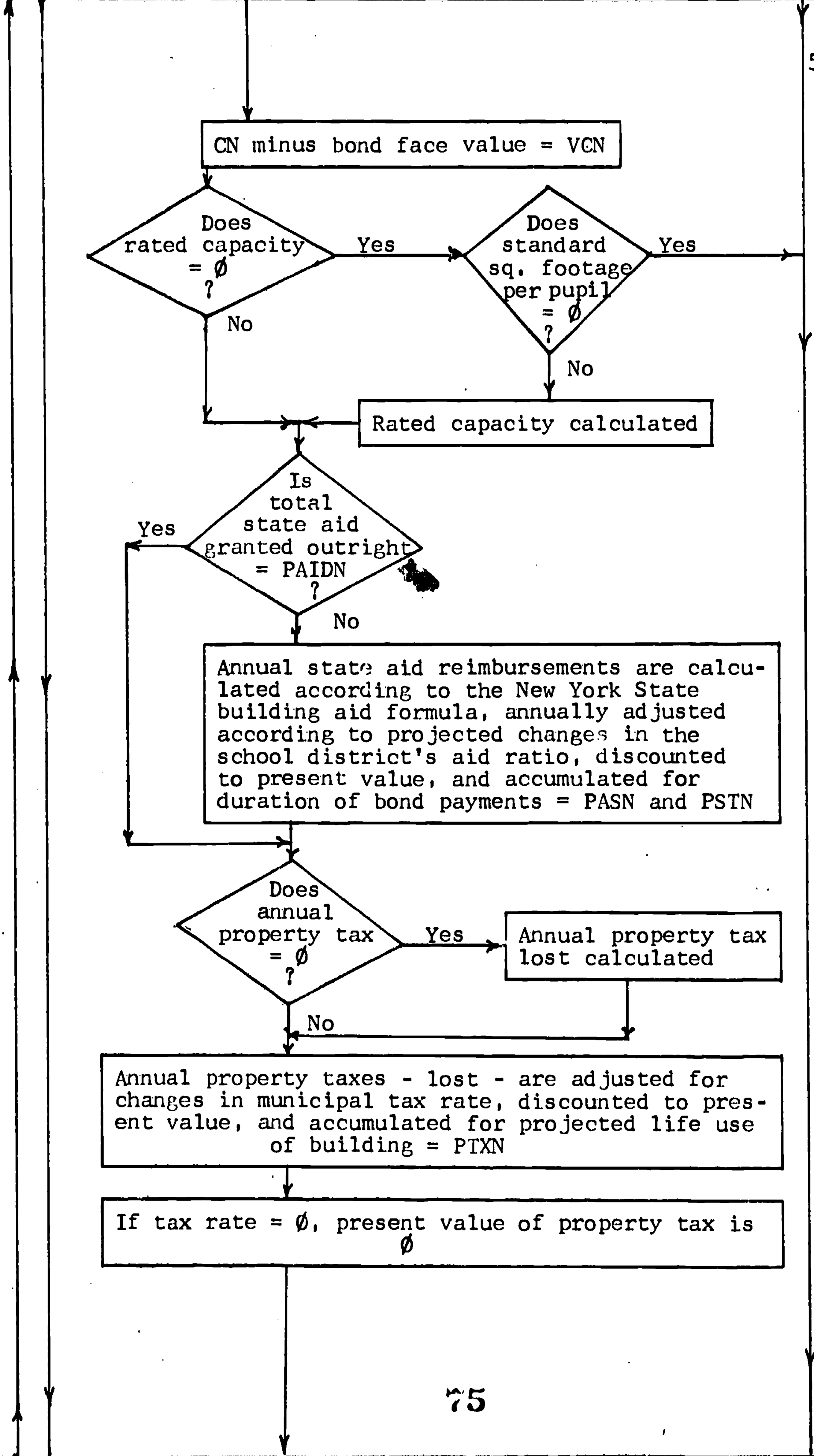
The flowchart which follows further describes the logic of the program.

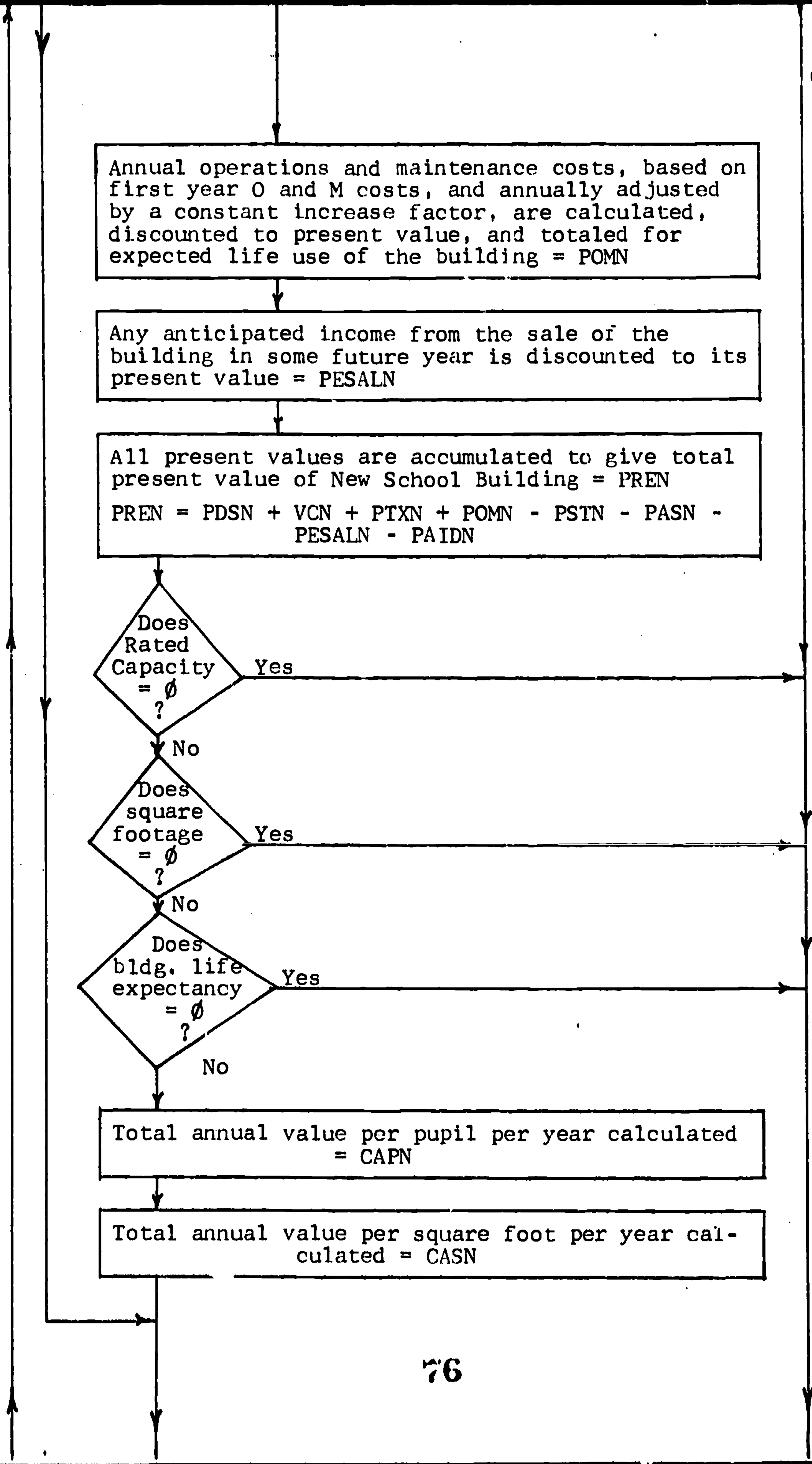
Flowchart of Cost Simulation Model

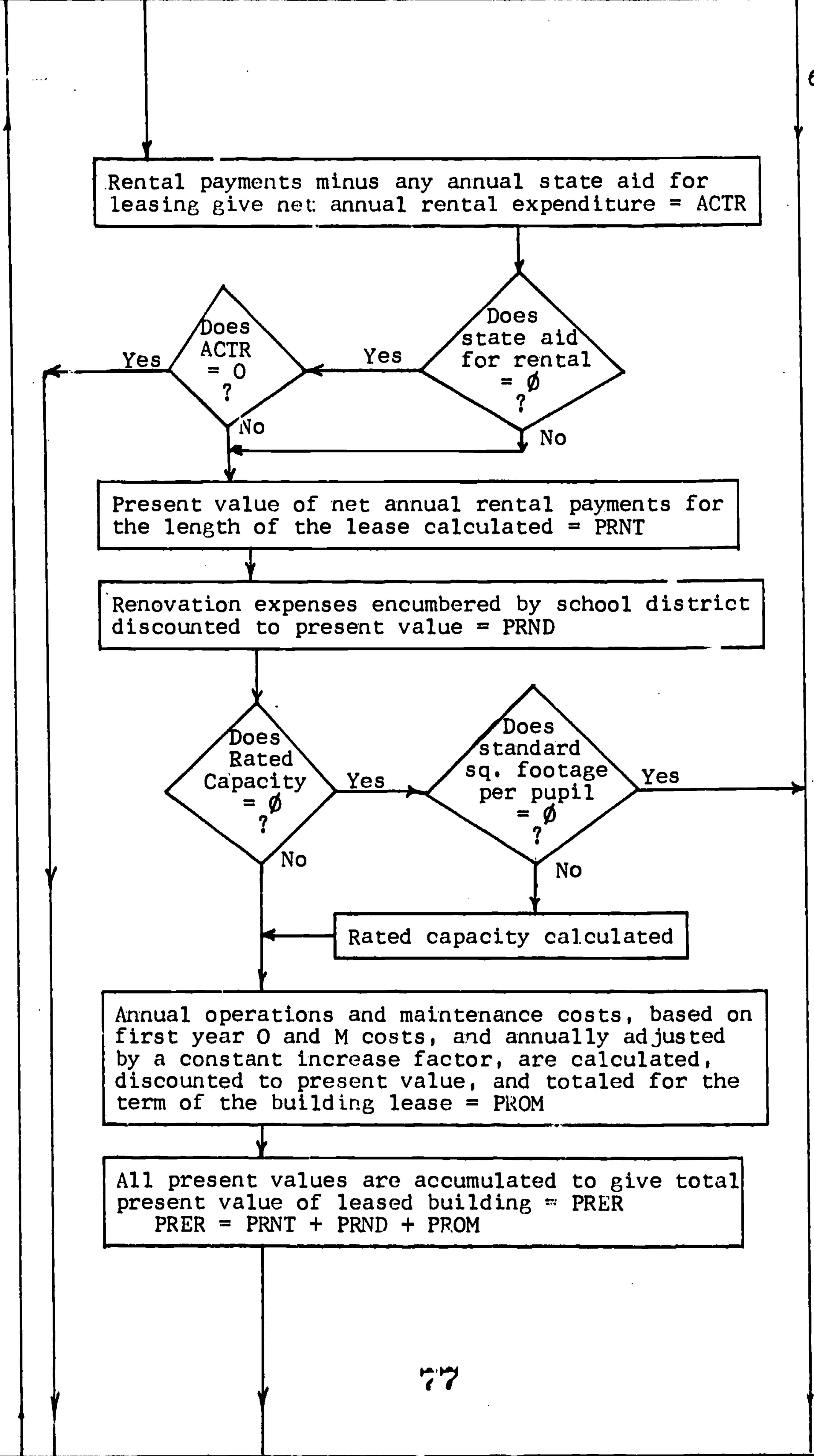


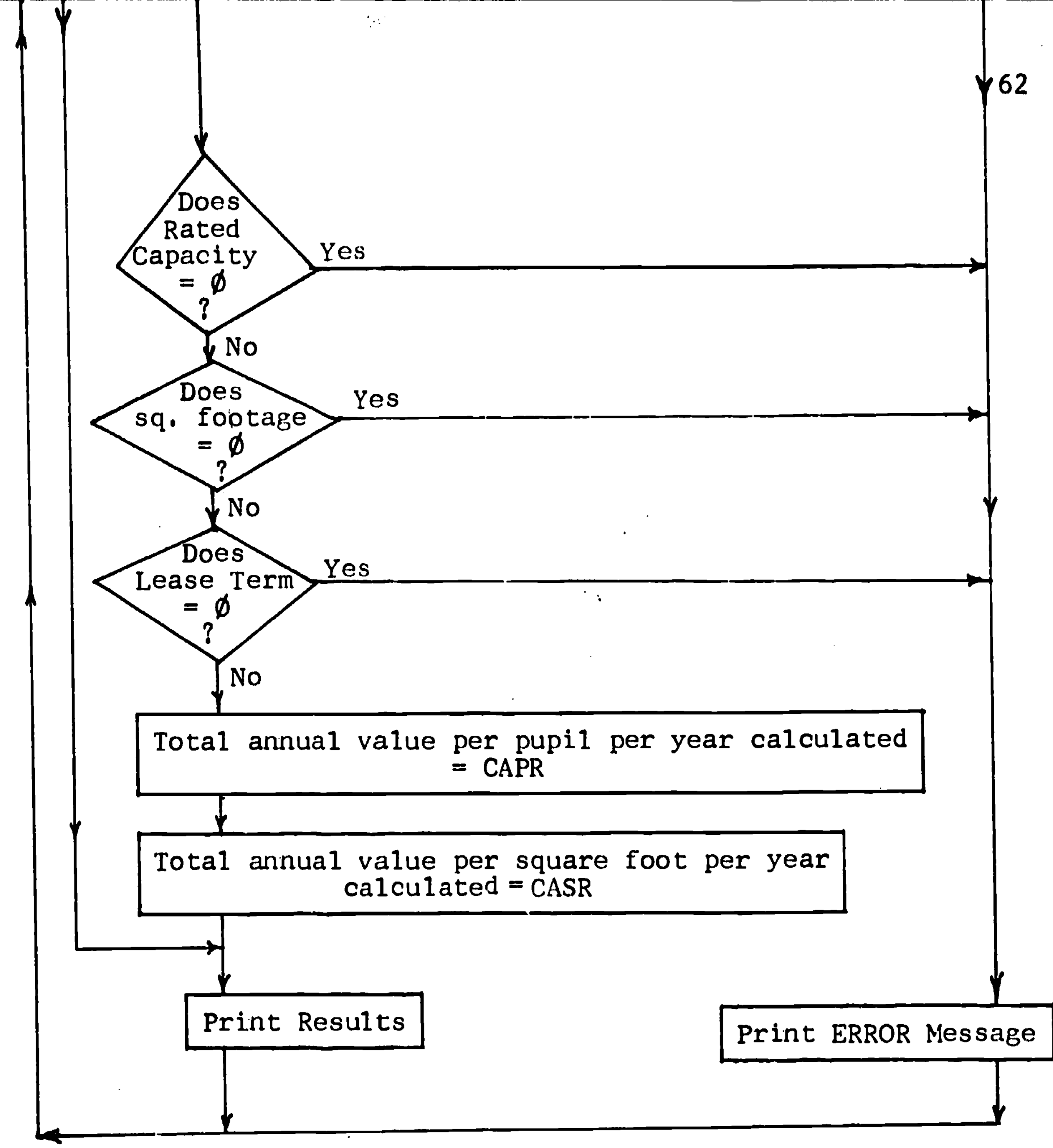

Present value of annual debt service payments are calculated = PDSP
CP minus bond face value = VCP
Does Rated Capacity = Ø ?
Yes
Does Standard Sq. Footage Per Pupil = Ø ?
Yes
No
No
Rated Capacity Calculated
Is total state aid granted outright = PAIDP ?
Yes
No
Annual state aid reimbursements are calculated according to the New York State building aid formula, annually adjusted to projected changes in the school district's aid ratio, discounted to present value and accumulated for duration of bond payments = PASP and PSTP
Does Annual Property tax = Ø ?
Yes
Annual property tax lost calculated
No
Annual property taxes - lost - are adjusted for changes in municipal tax rate, discounted to present value and accumulated for projected life use of building = PTXP
If tax rate = Ø, present value of property tax is Ø


Annual operations and maintenance costs, based on first year O&M costs, and annually adjusted by a constant increase factor, are calculated, discounted to present value, and totaled for expected life use of the building = POMP
Any anticipated income from the sale of the building in some future year is discounted to its present value = PESALP
All present values are accumulated to give total present value of Purchased Property = PREP
PREP = PDSP + VCP CXP + POMP - PSTP - PASP - PESALP - PAIDP
Does Rated Capacity = Ø ?
No
Yes
Does sq. footage = Ø ?
No
Yes
Does bldg. life expectancy = Ø ?
Yes
No
Total annual value per pupil per year calculated = CAPP
Total annual value per square foot per year calculated = CASP
Acquisition costs of new school building are summed = CN
Does CN = Ø ?
Yes
No
Present value of annual debt service payments calculated = PDSN


CN minus bond face value = VCN
Does rated capacity = Ø ?
Yes
No
Does standard sq. footage per pupil = Ø ?
Yes
No
Rated capacity calculated
Is total state aid granted outright = PAIDN ?
Yes
No
Annual state aid reimbursements are calculated according to the New York State building aid formula, annually adjusted according to projected changes in the school district's aid ratio, discounted to present value, and accumulated for duration of bond payments = PASN and PSTN
Does annual property tax = Ø ?
Yes
No
Annual property tax lost calculated
Annual property taxes - lost - are adjusted for changes in municipal tax rate, discounted to present value, and accumulated for projected life use of building = PTXN
If tax rate = Ø, present value of property tax is Ø


Annual operations and maintenance costs, based on first year O and M costs, and annually adjusted by a constant increase factor, are calculated, discounted to present value, and totaled for expected life use of the building = POMN
Any anticipated income from the sale of the building in some future year is discounted to its present value = PESALN
All present values are accumulated to give total present value of New School Building = PREN
PREN = PDSN + VCN + PTXN + POMN - PSTN - PASN - PESALN - PAIDN
Does Rated Capacity = Ø ?
Yes
No
Does square footage = Ø ?
Yes
No
Does bldg. life expectancy = Ø ?
Yes
No
Total annual value per pupil per year calculated = CAPN
Total annual value per square foot per year calculated = CASN


Rental payments minus any annual state aid for leasing give net annual rental expenditure = ACTR
Does state aid for rental = Ø ?
Yes
No
Does ACTR = 0 ?
Yes
No
Present value of net annual rental payments for the length of the lease calculated = PRNT
Renovation expenses encumbered by school district discounted to present value = PRND
Does Rated Capacity = Ø ?
Yes
No
Does standard sq. footage per pupil = Ø ?
Yes
No
Rated capacity calculated
Annual operations and maintenance costs, based on first year O and M costs, and annually adjusted by a constant increase factor, are calculated, discounted to present value, and totaled for the term of the building lease = PROM
All present values are accumulated to give total present value of leased building = PRER
PRER = PRNT + PRND + PROM


62
Does Rated Capacity = Ø ?
Yes
No
Does sq. footage = Ø ?
Yes
No
Does Lease Term = Ø ?
Yes
No
Total annual value per pupil per year calculated = CAPR
Total annual value per square foot per year calculated = CASR
Print Results
Print ERROR Message

Output

For each building alternative each of the component present values described above, the total present value, and the respe ive annual present values per pupil and square foot are derived and printed. The total present value figures permit decision-makers with a short-term space need to tell at a glance which alternative is cheaper under different cost assumptions. Length of building usage, unless still shorter than projected need, is irrelevant. For the situation in which the space need is long-term, or continuous, the annual per unit cost provides a valid comparative measure.

Besides projecting future costs, this program offers a powerful tool for analyzing past trends for future planning. By establishing a common unit of measure for the various component costs of a building - initial capital expenditure versus O and M costs versus tax loss, etc. - the relative significance and impact of each component can be more accurately determined within the context of a larger budget picture.

Using the Program

More technical information describing the design of the program and rules for its use are included as appendix D, along with the program itself, and a sample of the output.

PART II

PLANNING FOUND SPACE: A DISCUSSION

Throughout this study the basic invention of educational facilities planning was rediscovered and reinterpreted as a valid set of procedures for approaching found space conversion. As with most planning problems, in considering found space every situation must be treated separately. To this general conclusion the major additional contribution of this study is the cost simulation model. The basic theme that emerged from most of the conclusicns regarding found space is the importance of careful, coherent planning and broad consideration of alternatives. A secondary related theme is that found space, as much if not more than new school buildings, offers opportunities for revitalization, innovation and purpose reassessment far beyond the more familiar and immediate objectives of fulfilling space needs.

Yet, ironically, in practice found space conversions have often been characterized by haphazard planning, humdrum passivity, and uninspired results, just as, in many cases, the found space alternative was arrived at as a remedy for previous lack of foresight, poor planing or insufficient resources. Experience has demonstrated that found space often provides a solution to emergency conditions but it need not be limited to them. Found space is also a legitimate alternative for general educational uses and should be considered along with new school construction, modernization and other alternatives.

The chapters which follow explore found space conversions and pertinent aspects of facilities planning and draw upon

examples of actual experiences. Included are a survey of found space use; current administrative practices, procedures, legal issues and time factors; building code and renovation considerations; educational and environmental programs; and costs. Though examined separately, these various aspects of facility planning are fundamentally interrelated. Evaluations or decisions on any school facility alternative invariably entail tradeoffs. Consequently the purpose of careful planning is to improve the quality of information, clarify alternatives, expand understanding of consequences, and rationalize the weighting of factors influencing decisions. A subsequent chapter (IX) offers a framework for meeting these purposes.

No major surprises were discovered through this study. Expectations on fundamental issues such as cost, time, enrollment flexibility, and the like were mostly affirmed. There were, however, numerous minor surprises and each of the nearly 40 school visits offered some new insights which would be useful to anyone undertaking found space conversion. Few are universally generalizable; most depend rather on specific circumstances. These insights are incorporated into the sections which follow and provide examples substantiating general conclusions.

The first minor surprise was the extent to which found space has been converted for school use in New York State and the degree of variety in past use. This subject is covered in the next chapter.

CHAPTER IV

SURVEY OF USE OF FOUND SPACE

In the course of this research it was discovered that found space conversion has been used far more broadly as an alternative for varied purposes by public schools, particularly in cities, than had been anticipated before the study. Preliminary research had suggested that found space conversion had been very rarely attempted. Subsequent perusals of New York State Education Department (NYSED) files, New York City Board of Education (NYCBE) files, phone calls to school officials in cities throughout New York State, and general information through the grapevine revealed a somewhat different picture. A rundown of found space activity when categorized by school districts shows extensive recycling activity in certain places, especially New York City, and very little in others. The survey also reveals that educational programs are far more varied in converted buildings than in traditional new school buildings.

That the NYSED has tended to discourage the use of this alternative has surely influenced the fact that adaption of found space for educational use has not been extensive for most of the 700-plus non-city "upstate" school districts in New York State.[1] The major examples of any so-called

[1] In 1971 there were a total of 756 school districts in

"temporary quarters" by such districts have involved the use of manufactured buildings (i.e., "portable," "relocatable," "modular," "prefabricated" classrooms), facilities which do not fall within the purview of this study. They are mentioned here because they are categorized by the NYSED along with found space as "temporary quarters," technically allowable only under emergency situations.

Different experiences and regulations pertaining to found space prevail for the "Big Cities." In New York State the term "Big City" refers to those cities with populations greater than 125,000, for which special lesiglation applies.[1] Their policies and activities are less closely monitored by the NYSED.

Unquestionably New York City is by far the greatest user of found space for educational purposes. For this reason, and because New York City is subject to a special, generally less restrictive legislative category by virtue of its population over one million, it is discussed separately from the other big cities.

New York State. The "upstate" districts herein refer to all the school districts in new York State exclusive of New York City and the other five large cities.

[1] Buffalo, Rochester, Syracuse, Yonkers, and New York City - "The Big Five" - currently fall within that designation. Albany was among these cities until 1971 - until then it was the "Big Six" - when U.S. Census returns revealed that Albany's population had declined to 115,000. Since Albany was within this legal category for so many years it is included in discussions pertaining to the Big Cities.

Still another set of circumstances applies to the Boards of Cooperative Educational Services (BOCES), circumstances which are clearly related to the fact that BOCES have made extensive use of found space. The BOCES, usually organized along county lines, provide special, generally high-cost services to consortiums of school districts. Their services include educational programs for the handicapped and emotionally disturbed, vocational education programs, and in some cases computer services, media centers, etc.

The subsections which follow explore in greater detail the scope and variety of found space conversion in the different categories of school districts in New York State, pointing out patterns that emerge. In the next chapter we will speculate on some reasons for the different patterns.

Upstate New York

Adaption of found space for educational use has not been extensive in most rural, suburban, and small city school districts in New York State, henceforth to be referred to as "upstate" school districts. Most of the applications submitted for approval to the NYSED for so-called "temporary use of non-manufactured buildings" are for rental of church property, nearly always church classrooms. Applications for the temporary division into classrooms of school-owned bus garages are also common. Generally, however, the applications for temporary space under this category call for only one or two classrooms. For the 1972-73 school year there were approximately 170 applications for temporary use of non-manufactured

buildings, accounting for about 250 classrooms.[1] About half of the applications were approved by the NYSED, which means that fewer than 4,000 students were housed in such quarters.

Occasionally unusual spaces have been leased for educational purposes: a bank in Willsboro housed two classes of first graders in 1972-73 and in the 1973-74 school year, this same district purchased the building;[2] an automobile-showroom-cum-office-building in Amityville was rented for about seven years during the late 1950s to 1960s; a house in Schenectady has been used for several years for a resident homemaking project; and a portion of a hospital in White Plains houses classes for the emotionally disturbed in a kind of joint venture between the school district and the hospital.

Besides the Willsboro bank there appear to have been only three other instances in New York State excluding New York City (in recent years at least) in which a building was purchased and converted for school use. In each case the building was formerly a parochial school. In Sag Harbor on Eastern Long Island a convent, including its private girls' school, was purchased and converted into an elementary school for 385 children. The conversion entailed the demolition of most of the buildings on the site, with only one relatively new building - a combination dormitory, classroom, cafeteria building - retained and converted to classrooms and office space.

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[1]Excluding BOCES.

[2]Because of NYSED regulations regarding temporary quarters this building can be used for classroom purposes only for another three years, after which the district may use it for administration.

School districts have found it difficult to get more than temporary NYSED approval for the use of private and parochial schools because these schools generally do not meet NYSED building and environmental standards and often cannot be renovated to conformance without considerable expense. For instance, the dimensions of spaces in these private school buildings - i.e., their classrooms, corridors, stairwells - tend to be small, but the NYSED will not customarily approve a space of under 600 square feet for instructional purposes.

The Five Big Cities[1]

The Big Cities are exempted from the NYSED temporary quarter regulations. Most have rented church or synagogue related classrooms or basements; and in recent years some of these cities have taken short-term leases on more unconventional spaces for federal and state funded categorical programs - an especially appropriate alternative given the experimental nature and uncertain future common to such programs. Buffalo for the past two years has been using a converted supermarket as a Community Education Center, open all day and evening for a variety of programs funded by New York State Urban Education funds. Three years ago Yonkers converted a centrally located commercial office building into a Career Center funded with Vocational Education funds. Syracuse is

[1] Information herein is based on correspondence and phone conversations with Board of Education officials in each of the five cities - Albany, Buffalo, Rochester, Syracuse, and Yonkers - and a visit to Yonkers.

currently renting ten church classrooms for education of the mentally retarded and has also taken short-term leases on homes in various neighborhoods for after-school tutorial and home economics programs, also funded by various title programs. Syracuse last year was also seriously considering purchasing a one-story Sear's building, a combination store and warehouse - with the idea of constructing a gymnasium next to it and converting the existing building into classrooms for use as a high school; the plan, however, was rejected by voters.

For several years in the late 1960s Albany rented a classroom building on the SUNY campus and since about 1968 has been renting a four-story building in the downtown district for a federally funded vocational education program including courses in welding, automotive mechanics, carpentry, etc.

Of all these cities, Rochester has been the most active user of found space. Its expenditure on leased space increased from $92,000 in 1968 to $200,000 in 1971, and to $325,000 in 1974. Like the other cities Rochester has generally leased space for vocational, federally funded, and other alternative kinds of programs for which standard school buildings are not always appropriate. A former downtown sales office, a department store, several automobile showroom and repair garages, and several storefronts now house such programs as an alternative junior high school, a high school "without walls," and industrial arts and continuing education courses.

All of these cities are now facing declining populations and declining student enrollments. Albany has suffered the

most dramatic drop in population, but its population will probably begin to rise as a result of a massive downtown renewal (the "Mall") and other real estate developments. Each of the other cities, however, is *facing school closings* and the problem of how to dispose of empty school buildings, at least for the foreseeable future. Both Buffalo and Yonkers expect to terminate all their leases on found space school buildings within the next two years and to transfer their respective funded programs to vacant city-owned buildings. It is clear that more extensive use of leased buildings by these cities would have alleviated many current problems resulting from population declines.

None of these cities has purchased a found building.

New York City

Leasing and the conversion of found space for school use has been a common practice in New York City for many years. The vast scope of the New York City Board of Education's leasing operation is evident in table 3. The average of 120 parcels leased each year by the Board of Education for elementary and secondary school instructional purposes include some 1.5 million square feet of space occupied by an estimated 30,000 to 50,000 students.[1]

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[1]The square footage is based on "Facilities Leased by the Board of Education,1970-71, 1971-72, and 1972-73," prepared by the School Planning and Research Division of the New York City Board of Education. The pupil capacity estimate is based on an estimated average of 30 to 50 square feet per pupil in leased space.

TABLE 3

NEW YORK CITY LEASED SPACE 1970-73 (ROUNDED)

	Elementary & Secondary School Space		Total Space*	
	$	Parcels	$	Parcels
1970-71	3.9 million	124	7.0 million	216
1971-72	4.0 million	115	7.3 million	180
1972-73	4.5 million	120	7.4 million	197

*Including spaces leased for administrative use and special purposes (including funded programs). Based on: "Facilities Leased by the Board of Education," for "1970-1971," September 1970 and updated, March 1971, for "1971-1972," July 1971; and for "1972-73," updated, February 1973; prepared by the School Planning and Research Division of the New York City Board of Education.

The great extent of the leasing program in New York City can be attributed to widespread overcrowding in the schools as well as to the unavailability of building sites, fierce competition with other city agencies for capital funds, and a lengthy planning and capital budget process for new school buildings. As in the cities, already discussed, a considerable amount of space is also leased for experimental and alternative facilities, for which the standard school buildings are not necessarily appropriate, and for special state and federally funded programs. However, the use of found space even for these funded programs can also be viewed as relieving already crowded schools, an ancillary benefit though not a primary purpose of these special programs.

Nearly everyone agrees that anything and everything can be found in New York City. This is unquestionably true regarding found space conversions. The New York City Board of Education has *rented* and converted warehouses, factories, office buildings, bowling alleys, supermarkets, catering halls, movie theaters, storefronts, apartment buildings, community rooms, clubhouses, and churches. Churches and synagogues and their basements and related schools account for just over a third of the leased elementary and secondary instructional space;[1] and community and meeting rooms in New York City Housing Authority buildings constitute the next largest category of rented space.

In addition, during the past few years the Board of Education has begun purchasing buildings for conversion into schools. A bowling alley, a factory building, a Building Industry League Club House, a Boys' Club building, a catering establishment, a newspaper printing building, and a private music school building are among the buildings that have been either purchased or condemned by the city and converted to schools. The Board currently is giving serious consideration to the purchase of over a dozen other buildings. In actual fact special new project lines have been established as of the 1972-1973 New York City capital budget permitting the Board of Education to purchase and renovate existing space to

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[1]Ibid. In 1972-73 New York City leased approximately 45 church- or synagogue-owned spaces for elementary and secondary school use. Another dozen church- or synagogue-owned properties were rented for administrative and special purposes - mostly funded programs.

relieve overcrowded districts.[1]

BOCES (Boards of Cooperative Educational Services)

BOCES are regional organizations of rural and suburban school districts throughout New York State which furnish, at the request of the member districts, specialized instructional services such as vocational education programs, special classes for handicapped children, and support services like data processing, library book purchasing, and audio-visual equipment development and deployment. As of June 1972 there were 47 BOCES in New York State.[2] BOCES programs operated entirely out of rented buildings until 1967 and still use such buildings extensively.

All but 24 school districts are members of the BOCES covering their geographic area; the exceptions include the Big Five Cities, excluded by law from BOCES, the 12 other city school districts in New York State, and seven other districts. It should be noted, however, that these 24 districts enroll 4.2 percent of the public school students in New York State.

In 1972-73 BOCES throughout New York State rented approximately 135 buildings (i.e., found space) with about 700

[1]The project lines, E-1734 and E-1728, provide a lump sum for the purchase and renovation, respectively, of existing space. For the 1972-73 capital budget $6,000,000 was allotted for these purposes-$3,000,000 for each line - and in the 1973-74 capital budget the total allotment was increased to $10,000,000.

[2]The Fleischmann Report, Vol. 3, Chapter 11.

teaching stations (or classroom equivalents).[1] In addition BOCES frequently rent classrooms in school buildings of their member districts and sometimes entire unused school buildings until they are again required by the school district. As a consequence the BOCES have functioned as a windfall source of income to districts and as caretakers of buildings which would otherwise be a burdensome maintenance concern.

The Nassau County BOCES, formed in 1968, is one of the youngest BOCES and is also the largest as measured by the enrollment of its component districts, with 340,000 students. With an annual rental budget of $4,000,000 it occupied 42 separate buildings in 1972-73, ten of which were school buildings.[2] Now that many of the 56 school districts in Nassau County are experiencing enrollment decreases it may be anticipated that the BOCES will be approached to lease more school buildings. At present the Nassau BOCES rents schools, relocatable classrooms, and a large number of industrial buildings to house all of the vocational education programs, which are found to be more suitable than traditional high schools for Nassau County's vocational education purposes.

Besides the common use of church and synagogue properties and school bus garages, New York State BOCES have converted

[1]Based on information provided by the NYSED, Division of Educational Facilities Planning, and on examinations of their files.

[2]Nassau County BOCES information is based on telephone conversations and a visit (on April 25, 1973).

many less conventional spaces; examples include the use of farms for agriculture, conservation, and ornamental horticulture programs, airport hangars for aviation and auto mechanics, and wood frame houses, supermarkets, automobile showrooms and garages, and industrial buildings for varied purposes. A huge 165,000-square-foot industrial building in Nassau County now houses 43 separate occupational education programs.

Even this general survey of the uses of found space in New York State reveals certain patterns. The Education Laws and the administrative practices of New York State are a major factor in the determination of the patterns that have been observed and thus merit deeper investigation.

CHAPTER V

CURRENT PRACTICES IN NEW YORK STATE

Introduction: Governing Laws

Among the many responsibilities of the New York State Commissioner of Education as set forth in the Education Laws is the establishment and enforcement of standards and procedures for the erecting, repairing, enlarging, and remodeling of public school facilities throughout the state.[1] Accordingly, the NYSED through its Division of Educational Facilities Planning (DEFP), has devised a set of "Planning Standards" which are intended to assure the health, safety, and comfort of public school students and has established a set of procedures for the review and approval of plans and specifications for all school building construction costing more than \$10,000.[2] As provided in Section 408 (1) of the Education Law, these standards and procedures apply to all public school districts in the state except those in cities having a population of 125,000 or more, which are required only to submit an outline of plans and specifications for work costing more than \$10,000. This law makes a further exception for a

[1] As provided by Article 9, Section 408 of the Education Law.

[2] The Education Law provides that the Commissioner may, on his discretion, require prior approval of any construction plan costing less than \$100,000. Indeed, current practice does require such approval for projects costing more than \$10,000 in all but the large city school districts.

city having 1,000,000 or more inhabitants, namely, New York City, which is not required to submit plans or specifications for approval or adhere to SED planning standards.

Subsection (2) of Section 408 provides that no plan shall be approved that does not provide for certain health, safety and comfort amenities and subsection (3) provides that no plan shall be approved unless the site selection process involved reasonable consideration of such factors as "comprehensive, long-term school building program; area required for outdoor educational activities; educational adaptability, environment, and accessibility; soil conditions; [and] initial and ultimate cost." Subsection (5) provides that in a city of more than 1,000,000 (New York City) construction, design, and administration shall be performed by a bureau of the Board of Education established and maintained for this purpose.

As provided by the Education Law, the Commissioner is given rather wide discretion in the supervision of school facilities. Accordingly, he has ruled that:

> No temporary school quarters shall be used in school districts other than city school districts of cities having 125,000 inhabitants or more without the annual approval of the Commissioner of Education.[1]

"Temporary quarters" are defined as "substandard space in a building owned or leased by a school district for pupil occupancy, meeting the requirements of Section 167 of the Commissioner's Regulations [which describes health and safety regu-

[1] Regulations of the Commissioner of Education, Article XX, Section 168.

lations for existing school buildings] and used on a temporary basis" only "<u>under emergency conditions</u>."[1] In actual practice the DEFP will approve the use of rented temporary structures for up to three years initially, with two additional annual approvals, for a total of five years. Additional approvals will be granted if the school district can satisfactorily indicate progress toward a permanent structure (and also assure that a satisfactory educational environment can be maintained in the school).[2]

Clearly the NYSED discourages the use of temporary quarters for pupil occupancy, preferring, without explicitly saying so, permanent new school buildings. According to the DEFP, one category of temporary quarters is "rented, nonmanufactured buildings," that which herein is referred to as "found space."[3] Regarding this category, school districts are advised:

> this type of facility includes space in churches, firehouses, storefronts, etc., which will <u>never</u> become the property of a school district.[4]

The current situation regarding leasing for non-big city districts is terribly confused as a result of section 1726 of

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1 As defined in the "Manual of Planning Standards for School Buildings," Second Edition, 1967, Revised in 1969 and 1973.

2 Ibid.

3 <u>School Facilities Planning and Management News</u>, February 1973, Vol. 6, No. 2, Division of Educational Facilities Planning of the New York State Education Department.

4 Ibid.

the Education Law, on the "Lease and Lease-Purchase of buildings," which was enacted in July 1973. The section appears to be restricted to portable types of buildings because it specifies its provisions as applying to buildings "placed or erected on a site owned by the [school] district." It seems this section was intended to protect against flagrant practices and abuses by school districts and manufacturers in the acquisition of portable classrooms. Nevertheless, the effect of the law has been practically to abolish the financial or administrative advantages that might lead to leasing in the first place, as well as to confuse the entire rental program. For example, the section requires a referendum of the voters and the approval of the commissioner prior to a lease agreement and stipulates that for lease-purchase agreements, the total payments over the period of the agreement shall not exceed the purchase price plus 6 percent interest. No manufacturer in today's market is willing to accept six percent interest. Finally, the act repeals previous laws regarding lease and lease-purchase, including previous regulations for rental of rooms in non-school-district property.

As a result of this confusion the NYSED is not granting approvals on new applications for any kind of rented temporary quarters. It is, however, renewing old applications.

Furthermore, it is not totally clear whether or under what circumstances the purchase of non-school buildings is legally permitted for school uses, in spite of the fact that recent Commissioner Rulings provide for the purchase of such

buildings for educational purposes.[1] This confusion arises because of an apparent conflict in this instance between the legal authority of the Education Commissioner (as expressed through his rulings) and the Education Law, which is enacted by the State Legislature. That a separate state law was passed in 1971 regarding the purchase of existing school buildings -e.g., parochial schools[2]- suggests that similar legislative authorization would be required for the purchase of non-school buildings.

The new Commissioner rulings on purchase provide that the total cost of purchase and renovation (the value of the former to be determined by a local appraiser or to be based on municipal assessments) not exceed the state cost allowance for school buildings. This appears to contradict the New York State Education Law which indicates that a school district can buy any property it wants to. Additionally, the new rulings call for a 1 percent reduction in the cost limit for each year of the building's age over ten years. It does not clarify this procedure for the case of buildings with additions and/or modernizations during their lifetime. On the whole the procedures for and legality of the purchase approach are untested and unclear for the majority of the school districts in New York State - all, in fact, except the Big City School districts which are not affected by the

[1]Subsection 155.7 of the Commissioner's rulings added in January 1973 and amended in January 1974. This section also pertains to the purchase of existing school buildings.

[2]Chapter 414 of the Education Laws of 1971.

above mentioned laws and rulings. Rather, the large cities can purchase or lease any building without state interference.

On a more immediate level the state facility administrative operation, the executor of the legal policy, has taken a somewhat liberal interpretation of the laws and has attempted to remain slightly flexible in its consideration of found space use.

The Administrative Process

The NYSED by no means views found space as a legitimate alternative to a new school building. Administrative attitudes have surely contributed to the fact that found space use in upstate school districts has commonly been on an ad hoc basis, the result of haphazard occurrences and emergencies, not the result of sound planning. In contrast, the state laws and financing arrangements encourage found space use by BOCES, ironic given the special, generally more rigid requirements of many BOCES programs.

New York City, not bound by rigid laws regulating lease and purchase of existing buildings, has been encumbered by top-heavy city administrative machinery. In recent years the Board of Education has been endeavoring to rationalize its vast found space program. Efforts toward sound planning, however, are nevertheless still hampered by the involvement of numerous agencies and complicated bureacratic processes.

Upstate School Districts

As a rule applications for temporary space are filed with

the NYSED in the spring for the forthcoming school year. The four-page application form requires a spatial description of each room and its proposed use and a full description of the building's construction according to a provided checklist on the conformance or non-conformance of various items regarding construction and safety, in addition to requiring that a building plan be attached. The process is clear and straightforward except for the fact that the very need for temporary facilities arises, technically at least, from emergency and abnormal situations. Given this fact, and while generally discouraging the use of temporary quarters, the NYSED has tried to remain flexible.[1] When necessary, exceptions to the health and safety standards are made. If, however, a school district intends to make a facility permanent through a lease-purchase or lease-with-option-to-buy agreement, the NYSED will require strict conformance to their requirements for a permanent building. In nearly all instances temporary quarters which are purchased under such arrangements have been manufactured-type buildings, not found space.

The NYSED calls for temporary quarter applications 5 to 6 months prior to the beginning of school. Assuming a prior 2 to 3 months for shopping, negotiations, and application preparation by the school district, the average time for the

[1]Their posture of flexibility has been severely confused and constrained by the Legislature's enactment of Section 1726 of the Education Law - in July 1973 - an unclear statute that places unworkable conditions on lease and lease-purchase agreements.

acquisition of temporary school space may be 8 or 9 months. Of course the lead time actually varies considerably, particularly when existing buildings are considered for rental; building hunting, negotiations, and conversion time are not fixed entities.

In most instances the conversion of found space for school use in upstate New York school districts seems to have come about in an ad hoc manner, not as the outcome of a purposeful search. Typically, the existing school building was crowded and no new facility was in planning or construction; a crowded situation with which the school district had made do became less and less tolerable. Then, either a rental sign was noticed or someone heard of a building vacancy. More frequently than not the building was adjacent to or within short walking distance of the crowded school. Generally little money or time was expended for the renovation of these found spaces under short-term rentals. When modifications or repairs were necessary they were mostly performed over the summer at the expense of the school district, by the school industrial arts teachers or the maintenance staff.

Under such circumstances the entire acquisition process, from inception through approvals and building preparation to school opening is usually less than a year and more frequently a matter of six to nine months.

This is in contrast to the two and one half to three years from inception to school opening for a smoothly processed new school building. Snags during any of the many phases of the school building acquisition process will increase the

time. Common causes of delay include site acquisition difficulties (unavailability or high cost of sites, problematic subsoil conditions, and delays due to condemnation proceedings or relocation), unsuccessful voter referendums, redesign of plans due to bids exceeding the bond authorization (and beyond the point of feasible negotiations between the architect and low bidders), and construction delays. Clearly there is no upper limit to the cumulative time attributable to such delays, but it is reasonable to assume at least four years for the realization of the typical new school building in New York State.

In order to assure the health, comfort, and safety aspects of school construction and in an effort to reduce delays and costly mistakes the NYSED, through the Division of Educational Facilities Planning, has established a series of checkpoints at which their approval is required before a district may proceed.[1] Further, the DEFP strongly recommends that districts establish contact with the Division early in the planning of a project and that continuous contact be maintained.

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[1]The NYSED must approve: (a) the site before plans can be drawn for building upon it, and thus, effectively, before the Board of Education can prepare a site bond issue for voter approval; (b) preliminary plans with cost estimates (this stage is customarily preceded by at least one, and more commonly several, meetings of the DEFP with the local board and its architect), after which plans and budget may be submitted to the voters for approval; (c) final plans and specifications (generally preceded by other informal DEFP reviews). At this time plans and specifications must also be submitted to the State or Local Department of Health for approval of certain items, for which a minimum of 30 days is required. Bids may be let but contracts may not be signed without SED approval at this stage; (d) a supplemental cost data form, with information mandated by the legislature, must be filed, subject to which

In addition to the approval process the DEFP has compiled a Manual of Planning Standards (MPS), with requirements and recommendations regarding the development and design of school buildings as a guide to school officials, architects, and engineers. This publication is regularly updated and revised.

New York City

New York City's policy toward leasing and the use of found space for education is the most liberal in New York State, and for that matter, any place in the nation. This is not surprising given New York City's unique situation, particularly the frightfully high cost of land - school sites averaging \$323,000 per acre in 1971[1]-and the long, arduous building procurement, or capital budget, process.

In the past this has meant a minimum of 5 to 6 years for even the fastest, most smoothly processed new school, and more typically, 8 to 9 years.[2] These facts, coupled with sporadic but severe crowding in many of the city's schools, have led school officials to consider conversion of found space, particularly through leasing, as a solution to the space problem.

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filing the bond certificate may be withheld; (e) copies of addenda and change orders (which under no circumstances may exceed the amount authorized by the bond issue); (f) certificate of completion and acceptance of the building by the Health Department.

[1]Based on figures provided by the Bureau of School Financial Aid, N.Y.C. Board of Education. See appendix B-18.

[2]According to staff and officials of the New York City Board of Education, the N.Y.C. Bureau of the Budget, and the N.Y.C. Planning Commission, amongst all of whom there is a general consensus.

The New York City Board of Education has not bound itself to short-term leases. Of the approximately 200 properties currently leased by the Board of Education, 79 are for five years or more, as shown on the table below. Many other

TABLE 4

LONG-TERM LEASES OF THE NEW YORK CITY BOARD OF EDUCATION: 1972-73[1]

Years	Elementary and Secondary Schools	Administrative and Special Purposes	Totals
5-9	21	11	32
10	21	18	39
10+	6	2	8
Totals	48	31	79

properties are rented for equally long periods under annual lease renewals through an understanding between the Board of Education and the property owner. The high cost of renovating many of these buildings to meet Board of Education requirements has been the principal reason for assuming leases for ten years or more. The additional cost of the renovation, which directly or indirectly must be borne by the Board of Education, is effectively amortized over the length of the lease.

[1]Based on School Planning and Research Division, New

Most leases provide that the building renovation work is to be performed by the landlord to Board of Education specifications. In such cases the rental is negotiated on the basis of the fair market value of the space plus an agreed upon cost figure for the renovation (based on previous estimates by the two parties), which is also spread out over the length of the lease.

In other cases the Board of Education will perform the renovation - that is, through its own shopworkers or through competitively bid outside contract work itself, paying out of a lump sum capital budget appropriation to the Board of Education for modernization and rehabilitation projects.

Although the quality of materials and workmanship is much more reliable in those renovations performed by the Board of Education, the Board rarely opts for this approach. First, Board of Education work invariably takes longer, and most converted buildings are supposed to serve an immediate need. Secondly, fund availability in budget categories and priorities must also be weighed; found building conversions assigned to the modernization budget reduce the resources available for rehabilitating and modernizing the lighting, heating plants, sanitary systems, etc. in New York City's aged stock of school buildings.

As previously noted, in addition to leasing buildings,

York City Board of Education, "Facilities Leased by the Board of Education, 1972-73".

the Board of Education more and more often purchases found buildings for conversion. Prior to 1972, the purchase of such buildings entailed a time-consuming process of approvals. Each building had to pass through all the stages of the capital budget pipeline. Under this arrangement each project required its own budget line which meant, as a start, that prospective found buildings would have to be identified and proposed up to a year in advance of fund availability. As of 1972-73, however, the Board of Education was assigned two capital budget lines for lump sum appropriations for the purchase and renovation of existing buildings. This innovation was intended to reduce the time required for building purchases and appears to have succeeded. The average time of three years under the old procedures was reduced in one case to a record time of 13 months under the new.

Of the three procedures for acquiring found space, all other factors being equal, leasing with owner-performed renovations is the quickest, leasing with the Board of Education performing renovations is next fastest, and purchase with the Board of Education performing renovations is the slowest.

Renovations performed by the Board of Education, whether the building is leased or purchased, takes longer than privately performed work for several reasons: as a public agency the Board must advertise and take competitive bids; for jobs costing more than $50,000, including all extensive renovations, multiple contracts must be issued, under which construction work tends to be less easily coordinated and more

time-consuming; and, it is generally argued, public bodies, with their hierarchies of responsible authorities, simply have more checkpoints and are more sluggish than the profit-motivated competitive private sector. Specifically here, the Budget Bureau must approve each of the three steps of the design process. In addition, for reasons similar to those in the last point, Board of Education work tends to be of higher quality; extra care, it may be presumed, also takes some time.

Under normal circumstances in the past - that is, with no serious delays - the conversion of buildings entailing extensive renovations by each of these procedures could be expected to take respectively 18 months, 24 months, and 3 years from the inception of planning to school opening. Several years ago, however, the Board of Education adopted a policy of using space whenever possible "as is," which means with as few renovations as possible: only those necessary to satisfy the health and safety requirements of the codes.

In identifying potential buildings the Board is initially and primarily concerned that they be structurally sound, meet zoning requirements, and be close to the area of need. In retaining the buildings in "as is" condition the intention is to retain the natural attributes, elegance, or charm inherent in the building while meeting the needs of particular educational programs through the use of moveable and removeable furniture and equipment. This approach aims to reduce the time necessary to prepare and enter a facility, reduce the cost of renovations, increase the flexibility of the space and the recoverability of the artifacts, and emphasize the assets

of the space rather than re-create the institutional characteristics of most schools.[1]

Taking this approach, with the Board of Education thus far in each case performing all renovations, the processing and entry time has been reduced to a record three months for leases and 13 months for purchased buildings. These record times notwithstanding, many projects still take considerably longer.

The conversion of a found building in New York City requires the approval of three different policy boards and the input of about a dozen agencies and departments, which is essentially why the process takes so long. The process and the departments involved are discussed in greater detail in appendix E, "Procedures and Agencies Involved in Renting and Purchasing Found Space in New York City." Although there is substantial overlap in functions each board and department has a legitimate - and often conflicting - interest or expertise. Unfortunately, as in most vast bureaucracies work overloads, special interests, slippage, and ordinary error sometimes detract from effective performance.

Purchasing takes longer than leasing because more agencies are involved and feel they have a stake in the outcome (due to competition for scarce funds, for example). On high-priority purchase projects, which incur no political objection,

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[1]See Urban Educational Facilities Options, the final report of the New York City School Space Study Committee, Prepared by Rachel Radlo Lieberman, Mar 1972, New York, Educational Facilities Laboratories.

the evaluation of the Site Selection Board, which may take six months, is the main time-consuming factor. But where there are objections, for whatever reason, there are numerous opportunities for different agencies, and particularly the Budget Bureau, to sit on and delay the progress of a project.

BOCES

Until recently BOCES operated out of rented facilities which were rarely constructed specifically for their purposes. BOCES operated entirely out of such temporary quarters until 1967 when the Legislature authorized bonds to be issued for the construction of facilities specifically for BOCES purposes, subject to a referendum of the voters in the BOCES area. Under this arrangement the New York State Dormitory Authority acts as a turnkey developer, issuing the bonds and constructing the buildings which are then leased by the BOCES. Once the bonds are paid the buildings become the property of the BOCES. The BOCES finance their leasing expenses (together with other administrative expenses) by spreading costs among the member districts.[1]

In the context of the tightened financial condition of

[1]A portion of this cost is paid by the state with the remaining expenses allocated to member districts, whether or not they participate in specific BOCES programs, based either on the districts' comparative full property valuation or the weighted average daily attendance of resident pupils. Individual districts are charged directly for specific services provided by BOCES; for example, a fixed tuition is charged for each pupil enrolled in a specific program.

the state and the increased voter resistance to additional tax levies, only a few of the BOCES have been successful in obtaining new facilities of their own. Thus the BOCES are accustomed to renting buildings of all sorts in a variety of locations within their geographic area. BOCES are permitted to take five-year leases on buildings with an unlimited number of five-year renewal options, but all their rentals are subject to the approval of the NYSED. Member school districts determine in the spring how many children they will be sending to a BOCES the following year. Consequently it is difficult for the BOCES to know in advance precisely what their facility needs will be. The overall significance of the shaky position from which BOCES facilities operate, in terms of this study, is that one of the primary users of found space in New York State cannot really plan use of that space effectively or creatively.

Processing/Acquisition Time of Schools Visited

Turning now to time as another important aspect of administrative processes, it was found, based on the school visits, that the processing and acquisition time in all places for found space was consistently less than for new school buildings - as had been expected.

The time required to plan, acquire and convert found space has averaged one-fourth the time required by a new school building. This figure is based on a sample of 25 schools in three states. The time required for found space

conversion as a percentage of new school building was consistently low as revealed by table 5, which compares found space acquisition time in various places.[1] Table 6 shows that design and construction time for found space renovation, while much more varied, has also been less than for new school buildings, averaging slightly more than one-fourth (28 percent).

Table 5 also shows that the average time for found space conversion ranges from a high of 2 years in New York City, to 11 months in Boston, and only 2 months for a rented building in Lowell, Massachusetts. The fact that school facility acquisition takes longer in some places than others is reflected here. That 24 months in New York City, 14 months in Yonkers, 11 months in Boston, and 9 months in rural Perkasie, Pa. all represent approximately the same percentage of the acquisition time for a new school, 25 to 29 percent, reflects the factors other than legal formalities, design, and renovation which play an important role - factors like political process and bureaucratic machinery.

A closer look at the time components of individual found buildings suggests a general but by no means universal correlation between factors such as extent of renovation, design and construction time, and total project time. As is evident from table 21, while the Lowell H.S. Annex, the Harrington Church,

[1]Appendix B, table 21, is a full listing of the acquisition times for the schools examined, on which tables 5 and 6 are based and from which the rest of this discussion is drawn.

TABLE 5

AVERAGE ACQUISITION TIME FOR FOUND SPACE CONVERSION (IN MONTHS) AND AS COMPARED TO NEW SCHOOL BUILDINGS (IN PERCENT)

	Average Time (Months)		
Location (# of Schls)*	Found Space	New School	As % of New
New York, N.Y. (12)	24	84	29%
Yonkers, N.Y. (1)	14	48	29
Boston, Mass. (5)	11	40	28
Lowell, Mass. (1)	2	36	5
Philadelphia, Pa. (5)	13	66	19
Perkasie, Pa. (1)	9	36	25
TOTAL (25)	17		25

*Figure in parenthesis denotes number of found space schools included in average.

TABLE 6

AVERAGE DESIGN AND CONSTRUCTION TIME FOR FOUND SPACE CONVERSION (IN MONTHS), AS COMPARED TO TOTAL ACQUISITION TIME (IN PERCENT), AND AS COMPARED TO NEW SCHOOL BUILDINGS (IN PERCENT)

	Average Time (Months)			
Location (# of Schls)*	Found Space	New School	As % of New	As % of Total
New York, N.Y. (11)	9	24	38%	38%
Yonkers, N.Y. (1)	8	24	33	57
Boston, Mass. (5)	5	24	22	45
Lowell, Mass. (1)	.1	24	0	5
Philadelphia, Pa. (4)	6	32	20	46
Perkasie, Pa. (1)	3	20	15	33
TOTAL (23)	7		28	41

*Figure in parenthesis denotes number of found space schools included in average.

JHS 57, and PS 26 entailed little in the way of building modification and were opened as schools in a relatively short time, the PS 85 Annex took more than three years of ongoing negotiations to open - with virtually no renovations. On the opposite extreme, the building preparation period for the South Boston H.S. Annex and the Dennis Haley School, both in Boston, were very short - less than two months in each case - even though the renovations were extensive for both buildings.

Local political considerations, leading to extensive contract overtime, were important factors in each of these instances; such considerations figure as one of those factors which confuse any attempt to predict probabilities, design with foresight, or set standards and schedules.

State Building Aid

In New York State building aid is available for all expenses connected with the construction of new buildings, additions to buildings, or modernization of district-owned buildings for all districts employing eight or more teachers. Building aid is also available for the renovation of purchased "found" buildings.

Technically, expenses incurred for the lease of educational space are also eligible for state aid. Such reimbursement would be paid for out of state aid for operations. As a practical matter, however, most districts, including virtually all city districts, are already incurring operating expenses at a level well above the aidable ceiling beyond which the state will not contribute($860 per pupil). They therefore

receive no effective assistance for lease expenditures.

State building aid calculations are made on individual projects, and reimbursement is based on the school district's expenditure for that project in the current year; that is, aid is based on capital expenditures from budgetary appropriations or reserve funds, or, when bonds are issued, as is more common (98 percent of total statewide expenditures), on annual debt service payments.

The amount of aid a district receives is determined by two basic factors. One is the "approved" cost of the construction or the amount which the state will contribute; the other is the school district's aid ratio, a factor related to average daily attendance and the district's property wealth per pupil - inversely related to the latter. In districts of average wealth the state pays 49 percent of approved expenditures. Wealthier districts receive less and poorer districts more.

The approved cost of construction is determined by multiplying a cost allowance per pupil times the rated capacity of the building. Rated capacity is based on state guidelines which take account of teaching stations, nature of activity, and square footage.[1] The per pupil cost allowance is adjusted monthly based on a national cost index. For new school build-

[1]Capacity computations are fairly complex, involving numerous factors and standards. They are not ideally suited to experimental or innovative school building designs.

ings, the state will not contribute to expenses above the approved cost of the building. The ratio of approved cost to total building cost determines the amount of an annual expenditure (either debt service or capital outlay) which is eligible for state reimbursement. The amount of approved expense eligible for state aid in a given year is then multiplied by the district's aid ratio for that year. The aid ratio can change from year to year.

For converted non-school buildings the formula works in basically the same way with one significant caveat. State aid apportionment is based on the combined cost of purchase and any renovations necessary to meet requirements of the Education Law. However, the combined cost of purchase and renovation may not exceed the apportioned cost allowance for the structure. That is, the school district may not spend more than the maximum cost allowance as determined by the Commissioner's cost allowance index for labor and materials for the month in which the purchase agreement is signed. Furthermore, the maximum combined cost of purchase and renovation is to be reduced by 1 percent for each school year that the age of the building exceeds ten years.

The Commissioner's ruling[1] as written raises several questions. It leaves unclear how the percentage reduction factor should be handled for older buildings which have, during their lifetime, undergone modernizations or additions.

[1]Section 155.7 of the Commissioner's Regulations.

Strictly read, the regulation appears to jeopardize severely the risk to a school district which must deliver a renovated building within cost limitations based on date of purchase. No leeway is allowed for renovation cost overruns, unanticipated problematic conditions, or, apparently, for future needs. The acceptability and cost limitations on future modernizations is similarly unclear. And finally, the regulation as it is written appears to prevent a school district from purchasing a building in anticipation of need - i.e., facility banking - even for the short-term future.

There are numerous inequities in the New York State building aid formula[1]. One involves the per pupil cost allowance. Separate cost allowances for the elementary, middle, and high school levels, adjusted monthly on the basis of a national index, have not kept pace with the increased cost of labor and materials in New York State and, consequently, with the increase in school building costs. While school building costs increased by an annual average of 6.4 percent in suburban districts - 13.5 percent in New York City - the schedule of cost allowances averaged an annual increase of only 5.9 percent.[2]

Clearly the building cost allowance limits are felt particularly acutely in the cities, but not exclusively so. Of 35 non-Big City new buildings approved by the State Education

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[1]See The Fleischmann Report, Chapter 8, Part 1, for a more complete discussion of these inequities.

[2]Based on the schedule of "Pupil Allowances for Building Aid," from July 1961 to July 1973, NYSED.

Department in 1968-9, 26 exceeded construction cost allowances.[1] The trend, however, has mellowed somewhat; of the 15 non-city new school buildings reported to the NYSED in 1973, only seven exceeded the construction cost allowance limits.[2] The trend suggests that the disparities that do occur between actual building costs and approved costs may be for reasons other than the insufficiency of the cost allowance; inefficiency and extravagance might, for example, explain some instances of cost excesses. The possible occurrence of unessential frills, however, cannot by itself be held responsible for the high cost of school buildings in New York City.

On the whole, the basic problem appears to be that the formula does not take regional differences into account. Besides the construction allowance, an additional 20 or 25 percent allowance for elementary and secondary school buildings respectively is made for "incidental" costs, including site acquisition and preparation, furnishings, equipment, and fees. No consideration, however, is taken of the fact that these incidental costs, site costs in particular, are considerably greater in urban areas than elsewhere. As shown above, site costs per acre in New York City average over 55 times higher than the other districts in the state excluding the Big Cities.[3] Between the years 1964 and 1969 the costs of site acquisition alone in New York City averaged 19.54 percent of

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[1] As reported in The Fleischmann Report, Volume II, p.107.

[2] Based on NYSED, DEFP Semi-Annual School Cost Reports..., March, Sept., 1973.

[3] See pages 25-26.

total construction costs, leaving a negligible allowance margin for other incidental expenditures.[1]

It is of further significance in this context that the state will aid the cost of site acquisition only if a general construction contract is awarded within one year of purchase. Otherwise the state will aid outstanding annual debt service payments starting only in the year a construction contract is signed. This rule discourages advanced site acquisition which would save money in the suburbs where land prices are rising rapidly, and in dense urban areas where advanced site assemblage is normally essential. The alternative to advanced site assemblage is condemnation of property, which inevitably leads to lengthy court suits, settlement of which typically takes three or more years.

Clearly the New York State building aid formula operates to the detriment of all large cities generally and New York City in particular. In 1969-70, for example, 34.5 percent of the state's school building expenses were incurred by New York City, yet New York City received only 18.3 percent of the total state aid paid. Only 24 percent of the total debt service paid by New York City in that year was reimbursed as compared to 57 percent reimbursed to the non-Big City districts. Furthermore the approved portion of debt service and the amount of state aid, as a percentage of total debt service, has shown a steady decline for the Big Cities and again for New York

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[1]Based on figures supplied by the Bureau of School Financial Aid, N.Y.C. Board of Education. See appendix B-22 for a complete table of building allowances and site

City in particular; meanwhile these ratios have increased for the remaining districts in the state.[1] Complete tables illustrating these trends are found in appendix B.[2]

In summary, New York State building aid does little to alleviate the economic burdens of the Big Cities, particularly New York City. Disproportionately high costs of land and construction, which are rising more rapidly than the increase in the cost allowance index, and ironically, a decline in the aid ratio, caused in part by the escalating property values which inflate construction costs, have resulted in an annual decline in the percentage of state aid reimbursements. "Municipal overburden," the bleak financial condition endemic to cities which must provide an extra portion of services for high-density populations, large concentrations of poor, and a wide metropolitan area, is even further exacerbated by the fact that New York City residents contribute a greater percentage of state taxes than is returned in school building aid.

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costs in N.Y.C.

[1]These figures are based on data provided by the N.Y.C. Board of Education, Bureau of School Financial Aid, NYSED, DEFP and the Division of Educational Finance.

[2]The relevant tables included in this appendix are:
- Table 23, Building Expenses and State Aid in New York State, 1969-70, illustrating the overall building expense and aid picture for that year;
- Table 24, Debt Service and State Aid in New York State, 1969-70, which shows the apportionment of aid and the approved debt service as a percent of total debt service for that year for each of the Big Cities and the rest of the state;
- Table 25, Apportionment of Debt Service and State Aid for School Building in New York State, 1965-70, which shows the declining trends for the cities and the increasing trend for the remaining districts in the state; and
- Table 26, New York City Debt Service for State Building

To the extent that any categorical grant-in-aid represents policy, the purposes of New York State building aid with respect to cities would seem to contradict its purpose. Specifically, this state aid program offers cities relatively small financial incentives to follow the State Education Department's preference for new school buildings. In this context the NYSED's objections would appear to offer little resistance to the growing use of found space for schools in New York City.

Other states, notably Massachusetts, offer a contrast to New York's building aid formula. Under Massachusetts' "Racial Imbalance Law" up to 65 percent, and not less than 40 percent, of new school construction costs are reimbursed.[1] Under new legislation which went into effect on February 10, 1974, the conversion of existing buildings is aidable to the same extent as new school buildings so long as the buildings meet the state site standards for school buildings. No special reimbursement is allocated for leasing buildings other than general state aid for operating expenses. Site acquisition costs, however, are not reimbursed, the consequence of which is to encourage municipalities, and especially high-density cities like Boston, to acquire cheaper land or buildings and spend more on improvements. For example, "leftover"

Aid, 1962-63 to 1970-71, which shows the steadily declining percentage of state aid and approved debt service received by New York City during this period.

[1]The Massachusetts racial imbalance act rewards efforts to racially integrate school buildings, through site selection, by providing for reimbursement of the total school building

sites, deemed economically unfeasible by private developers, often require abnormal expense to correct problematic site conditions such as subsurface water, poor soil conditions, uneven terrain, and excavation problems.[1] Therefore, the by-product of this aid policy is to subvert outcomes.

It might be helpful in this discussion to consider aid practices in another state. Pennsylvania has the most liberal laws of all, found space conversion having always been allowed. With the addition, moreover, of laws enacted in 1972, state aid reimbursement on a per pupil basis is now available for both leased and purchased buildings, in the latter case both for building purchase and renovation.

The state building aid formula in Pennsylvania is basically similar to New York State's, with some significant variations. The per pupil cost allowance, which varies for elementary, middle, and high schools, is set by legislative statute rather than by a national index - a minor difference. More significant is the so-called Taj Mahal Act[2] which allows schools to be constructed without a public referendum as long as the total cost falls within the building cost allowance as computed according to the state aid formula. A referendum is required for building expenditures above that limit. With

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construction in proportion to the racial mix of the school enrollment.

[1] A bill has been drafted that would provide state reimbursement for site and building purchase costs.

[2] Act 34 went into effect October 1973. Philadelphia and Pittsburgh are exempt from the provisions of this act.

regard to this study, the most significant difference from New York State's formula is that Pennsylvania, as of 1972, provides a per pupil allowance for the lease of existing buildings, as well as separate allowances for purchase and remodeling of buildings for school purposes.[1] As such they are markedly better than New York State's formula. On the whole the differences in the systems would appear to indicate a more rational and coherent state policy approach to the found space alternative in Pennsylvania.

In every state the approval of applications and plans for the use of non-school buildings is contingent on their meeting minimum state code requirements and standards for school buildings. These make sense. On the other hand, state laws and standards which confuse rather than clarify decisions and planning processes do a disservice to local administrators and potential users of educational facilities.

Summary and Conclusions

The effect of the policies and practices of the NYSED has been to discourage found space conversion, except in BOCES, for the school districts to which they must grant approvals - the vast majority of the school districts in New York State. The disincentives are clear: state building aid has not been available for found space conversion; a measure of uncertainty and insecurity has been fostered by requiring annual approval of leases, which in any case are allowable for

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[1] Act 89.

a maximum of five years; for various legal and attitudinal reasons purchasing and recycling an existing non-school building strictly for school purposes has never been accomplished in a non-city district; and the notion of found space is denigrated categorically by defining any leased premise or building not originally intended for school purposes as "substandard" and allowable only "under emergency conditions."

These policies may be characterized, rather kindly, as unimaginative. The NYSED takes justifiable pride in the thoroughness of its regulations, particularly as they protect against building mistakes and disasters. In facility matters such as environmental standards, state aid, legal and procedural regulations, and the like, the NYSED has acted cautiously, perhaps too cautiously. Protection has come about through fairly strict standards and guidelines which encourage similitude and restrict experimentation.[1]

The failure to connect facilities planning with educational philosophy may be seen in the contrasting laws, attitudes, and procedures which inhibit found space conversion by

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[1]For example, in a sample survey of 452 plans of schools built in New York State between 1968 and 1971 (45 percent of the total) less than 15 percent contained cluster groupings (13 percent) or open space organizations (2 percent). Only 21 percent had adaptable partitioning or any other arrangement (including the 15 percent already mentioned) which allowed flexibility in spatial organization. Nearly 80 percent were built entirely with self-contained classroom arrangements and no flexible instructional space of any kind. The point here is not that one type of spatial plan is inherently better than others but rather that in New York State variety and innovation in school facilities have been sacrificed for similitude. (Based on a survey conducted in 1972 by staff of the Fleischmann Commission.)

non-city school districts. Meanwhile the financing rules pertaining to BOCES until 1967 prohibited BOCES use of any but recycled buildings and continue to encourage found space conversion rather than new school construction. Although existing buildings may be superior to new construction for changing needs in specialized occupational education programs, it is ironic that the NYSED policies effectively give preference to found space use for the education of the physically and mentally handicapped. The environmental needs of handicapped children - in particular for those whose defects are sufficiently severe that they require treatment outside regular classrooms - are far more rigorous than those of so-called "normal" children in conventional instructional programs. Thus it appears that where absolute standards in institutional planning might be most justifiably demanded, improvisation is encouraged; meanwhile uniformity and rules are stressed where imagination and freedom might profitably be allowed. The laws and NYSED regulations seem to work backwards in this respect.

The acquisition and renovation of existing buildings in all places has consistently taken less time than the construction of a new school building, averaging one-fourth the time. To the credit of the NYSED their procedures are reasonably efficient for upstate school districts. The process in New York City, in contrast, is lengthy, bureaucratic, political, and cumbersome; yet it is still four times faster than that for building a new school. Studies and recommendations toward streamlining facility procurement and general capital budget processes are regularly proposed. Separate Board of Education

project lines for purchase and renovation of existing buildings are the latest example of such efforts. Whether these will be an improvement over the long run or whether, like other changes, they will be integrated into the fabric of interest conflicts and delay remains to be seen.

There has been a definite trend in the past few years by legislatures and state education agencies toward liberalizing laws pertaining to the use of found space for schools. In the past two years each of the three states examined in this study - New York, Massachusetts and Pennsylvania - has added laws which enable and/or provide state aid for the lease or purchase of found space.[1]

Education Laws and Regulations of the Commissioner of Education in New York State which went into effect in 1973 and which apply to all school districts except those within the five Big Cities, were ostensibly intended to facilitate the use of existing buildings but have also increased the confusion. Both lease and purchase of existing buildings are now technically legal and in the latter case eligible for state aid. Leasing, however, has been rendered practically unfeasible, and the State Education Department is not presently approving any new lease applications. The regulations concerning purchase are also confusing and for the present remain

[1]The statutes of the State of New Jersey have not changed in recent years; existing laws, however, treat purchase and conversion of non-school buildings basically as new school buildings. Leasing of any building is also provided for by existing laws, although long-term leases are unusually complicated and disallow lease-purchase arrangements. New Jersey general aid formulas have no special aid provision for any

essentially untested.

Regardless of the intent of policy decisions, these New York State education laws and regulations for non-city school districts must be clarified. When school officials and planners are trying to make decisions, at least the facts on which they must decide - the standards - should be clear.

Second, if practices regarding found space are really to be liberalized, state aid provisions should be modified. As an incentive to considering leasing of buildings an annual state reimbursement allowance should be offered, as in Pennsylvania. A rental allowance, particularly if tied to requirements for enrollment and cost projections, would help rationalize planning procedures as well as stimulate experimentation with found space. In times of educational change and enrollment fluctuation and uncertainty such a provision would provide an element of common sense.

Parenthetically, connecting such aid to questions of racial balance, as in Massachusetts, might be a nobly motivated action but is impractical and fraught with problems, not the least of which is the current divisiveness of the integration issue in New York State (and elsewhere). It is becoming increasingly clear that the New York State aid formulas, as well as the overall education financing system of which they are a part, are inequitable. If the overall financing system is not changed, either by the legislature or the courts, then the building aid formula should be. That construction costs,

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school building.

site costs, rentals, and other building expenses are disproportionately higher in the cities, and particularly in New York City, should be taken into account.

CHAPTER VI

FOUND BUILDINGS: CODE AND RENOVATION CONSIDERATIONS

The lawful use of any building requires the issuance from the building department of a certificate of occupancy, which in turn is contingent upon compliance of the building to the provisions of the several codes, including fire, health, zoning, and building codes. An existing certification of occupancy will suffice until changes in a building are made, which nearly always occurs when found space is converted to a school. The codes normally have provisions covering virtually every aspect of buildings.

The purpose of codes is to assure minimum standards of health and safety and to influence the quality of the physical environment for different occupancy uses. A universal problem for any set of standards, no less so for building codes, is assuring minimum qualitative standards without limiting creativity and flexibility.

The conversion of the Sumner Avenue Armory in Brooklyn to an annex for JHS 57 is an unfortunate illustration of the impact such codes can exert in the name of health and safety. The original armory building was solidly and opulently constructed, with a monumental polished wood staircase rising four stories, empaneled wood rooms with coffered ceilings and large fireplaces, an intricately carved wood overhanging second-story mezzanine, etc. In its conversion from military quarters, training facilities, and offices to a public school

much of the elegant detail of the building was covered. Fire regulations relating to the extensive wood construction prevent use of the building above the first floor. Consequently the grand stairway, the mezzanine, and small turret stairways in the back corner of ground floor rooms, have all been enclosed with large, unattractive surfaces of sheetrock. New exits have been added, destroying the character of the rooms into which they were cut. Nonetheless, the high quality original systems still function well except for the lighting, which is insufficient (especially now that the natural light which used to filter through the mezzanine and stairway has been shut out). The lack of light and makeshift renovations have resulted in a generally depressing substitute for the old building's elegance.

Two factors account for the compromised renovations undergone by the physical environment of this armory. First, the physical environmental requirements of a school are unquestionably different from those of a military establishment. Second, and no less crucial in this case, federal installations need not adhere to local codes. Even though this armory was well constructed, when the NYCBE accepted the building from the federal government the regulations of local codes became effective.

The essential advantage of such buildings is that they are donated by the federal government to local governments. In another instance, however, code considerations made even this low price suspect. The Philadelphia Board of Education

was offered a federal treasury building, a monumental granite structure not far from the city's center, but rejected it after estimating the cost of opening the building as a school.[1]

The different codes as they apply to various occupancy classifications have many common characteristics.[2] The differences between federal building considerations and local requirements, as suggested by the above examples, point to the variety in major aspects and details of codes in different places. On the one hand, variety takes into consideration diverse regional conditions in such factors as climate and geological conditions. But patterns of similarity and variations in codes do not always follow geographic boundaries. In New York State, for example, school buildings in all places except the Big Cities must conform to the state building codes as well as the provisions of the nearly 200-page Manual of Planning Standards for School Buildings (NYSMPS) put out by the NYSED.[3] In the Big Five cities which are located throughout the state, school buildings must conform only to local codes.

As a consequence of this system, some odd discrepancies

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[1]A Philadelphia community college has reportedly taken the building, presumably on the basis of different estimates.

[2]Appendix F summarizes typical code provisions which are particularly applicable to converting existing buildings to schools. They are by no means a substitute for a qualified architect's services and a careful examination of pertinent codes.

[3]NYSED, Manual of Planning Standards for School Buildings, Second Edition, Revised in 1973 (Albany, New York).

in policy viewpoints appear. The NYSMPS, for example, requires exterior window surfaces to be equal to a certain minimum proportion of the floor area of instructional rooms. This requirement is based on visual health considerations. There is no such requirement for schools in New York City, and, as a consequence, there are numerous windowless schools there.

The codes tend to be complicated, occasionally contradictory, and highly detailed. Minimum requirements are specified for dimensions, materials, and ratios, but for each of these there are numerous exceptions, variations, and interrelated factors (like doors, stairways, temperature, lighting) which must be coordinated. Greater specificity in building codes may help prevent building tragedies and minimize subjectivity in the treatment of individual cases, but it can also compromise individual freedom and limit innovation. With continuous discoveries and new developments in building materials and techniques, building codes are regularly revised but just as regularly are criticized for being obsolete and overly rigid.

As in any other industry or endeavor, enforcement standards and policies may vary among different individuals, departments, or administrations. Despite the specificity of the codes there is still room for subjective judgment. The surest course in any construction is to follow a strict interpretation of the codes; yet in any complex construction project, including many building renovations and occupancy changes, the strict course may be prohibitive or even unclear.

Many of these factors came to bear on the conversion of the Fifth and Luzerne building in Philadelphia.[1] When parts of the building were first renovated for schools the architects secured an administrative variance permitting existing glass block windows to remain. Subsequently, when a new District Attorney was elected in Philadelphia after campaigning on issues of corruption and leniency in government, he chose the Fifth and Luzerne building as one of his targets. As a result the glass block had to be replaced with operable sash windows throughout the six-story building.

The difficulty of discerning or following the strict meaning of some regulations and the high cost of following others, together with the continuing development of new ideas, materials, and techniques, points to the need for mechanisms by which exceptions to the rules may be obtained. Two such mechanisms are common: the first is a process of appeal or review by which exceptions or variances may be granted; the second is graft. To give an example of the first mechanism, an early concern in considering any existing building (or vacant site) is its location with respect to zoning ordinances. The specific regulations may vary for different school grade levels and program types. Thus, while school activities are usually not permitted in industrial zones, variances may be obtainable for certain vocational programs. Besides defining permitted uses in a given area, zoning ordinances also define minimum lot sizes, access requirements, frontage along

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[1]See pages 186-188.

the streets, setback requirements, and building heights.

Obtaining a variance in zoning may entail submission to the concerned authorities or agencies of multiple sets of building plans, at a cost upwards of several hundred dollars, showing proposed modifications. Together with hearings, which follow, the entire process can be expected to take at least several months. Further, if the use of a particular building for education purposes requires a zoning variance and a variance is secured, the reuse of the building for its original purposes may have become more problematic.

Clearly, securing a zoning variance is not a desirable course to follow in the case of short-term space needs. This example illustrates the fact that waivers are time-consuming and are normally not granted lightly.

Perhaps due to the difficulty of obtaining waivers to building codes through bureaucratic processes, an alternate and probably more common mechanism for skirting the rules is graft. Payoffs of all types and at all levels are quietly common in the building industry,[1] - such as slipping a few dollars to an inspector to assure that a minor violation is overlooked. This alternative is, of course, illegal, and even though payoffs go undetected, contractor costs are passed on to the client. For building renovations there is sometimes

[1]Periodically graft in the building industry comes to public attention. Perhaps the most noticed example involved former Vice President Agnew, who was forced to resign his post because he accepted a payoff. The Knapp Commission (1971-72) on police corruption in New York City, during the course of its primary investigations, also uncovered extensive payoffs throughout the building industry.

another mechanism, aside from appeals and payoffs, which allows some leeway in dealing with the codes; this mechanism entails determination of which code applies to the renovation when the code has undergone a revision. Some buildings in need of renovations will have been originally constructed in accordance with a building code which has since been replaced. In such cases the question of whether the building is to be renovated in accordance with the old or new code may arise. Depending on the circumstances each code is likely to have benefits and disadvantages pertaining to the particular building as regards materials, fire provisions, occupancy, inspections, etc. For example, the new code in New York City (1968) tends to allow higher occupancies and more variety in selection of materials but is more stringent on fire provisions and requires more inspections. And recent revisions of the NYSMPS include more rigorous provisions regarding the physically handicapped, requiring, for example, elevators in multi-story buildings.

Which code applies to the alteration is usually determined by the extent of renovation or renovation cost as a percentage of the total building or building value. For example, in New York City if the cost of alterations over one year is less than 30 percent of the building value, plans can be filed under the old code. If alteration costs over a one-year period comprise 30 to 60 percent of the building value, the portions of the building altered must comply with the new code. And if alterations over a one-year period exceed 60 percent of the building value, the entire building must be

made to comply with the new code. Judgments on whether to file plans under the old code or the new code - that is when renovation needs allow a measure of flexibility in the choice - must be made in consultation with an architect.

Renovations, of course, are nearly always a necessary part of converting found buildings for school use. Unless only cleaning and slight patching are required ("as is" condition) the extent of renovation may range from minor modifications and repairs to complete gutting and all new systems. The found space was used "as is" in only three of the cases visited during this study. The vast majority of the found space school buildings required much more extensive work. Tabulations on the found space conversion of 30 found buildings for which information was available are summarized in table 7.

TABLE 7

EXTENT OF RENOVATIONS ON FOUND SPACE SCHOOLS VISITED

Extent of Renovation*:	(1)	(2)	(3)	(4)	(5)
Number of Schools:	3	3	9	12	3

*The meaning of the numbers, rating the extent of renovating, is: (1) Cleaning and cosmetic patching; (3) Systems upgrading, minor structural changes, and non-structural modifications; (5) Complete gutting and new systems; and (2) and (4) in between.

In several ways the renovation of buildings can be more difficult than new construction. Particularly in the case of extensive renovation of older buildings there is a problem of uncertainty. Original copies of building plans often have errors which even careful building surveys will not detect prior to demolition. In the case of the Fairmont Theater/ Ethnic Museum, for example,[1] a specially fabricated steel beam had to be sent back because there were errors on the original plans; one column to which it connected was two feet off its specified location.

Working conditions in renovations are also generally more difficult than in new construction. More customized materials and labor are required, and enclosed built-up spaces encumber access and maneuverability of machinery and equipment. Thus, of the four major factors which contribute to the cost of any construction - materials, manpower, machinery (and equipment), and money (i.e., interest on borrowed financing), - "the four Ms" - three are potentially more problematic in renovations. Old (and new) buildings may present idiosyncratic problems when new purposes are being considered.

The bowling alley which was converted to the Newtown H.S. Annex had an idiosyncratic condition that resulted in higher costs. A major structural problem was posed by unusual I-beam girders upset above the floor level at 23-foot intervals (parallel to the old bowling alleys). To convert the original building to classrooms required construction of a new floor on

[1]See pages 140-141.

top of the old one as well as reinforcement of structural supports to compensate for the increased weight. These extensive modifications were expensive (approximately $100,000 for leveling the floor). They illustrate, however, that the parameters of found space conversion may include the modification of existing buildings in accordance with predetermined program specifications. Or to borrow a common adage, where there's a will there's a way. Whether or not it's worth finding a way is another question.

Idiosyncracies aside, certain common characteristics are often present in a given building type. As a sample, the general characteristics of bowling alleys and loft buildings and the positive and negative implications of these characteristics for different educational uses are discussed in appendix G. They are intended as a guide for those who are considering such building types for conversion to schools. Similar guidelines in relation to converting other kinds of buildings might be welcome additions to the literature of facilities planning. The following listing presents some of the specific conclusions reached while investigating code and renovation experiences for this study; the list also attempts to illustrate the kind of information sharing that might go on more often among planners.

- In the search for found space high-ceilinged buildings have certain advantages in flexibility: higher ceilings are more easily adapted and more adequate for physical education programs; and when extensive renovations are required high

ceilings allow for the addition of ductwork, wiring, and other necessary mechanical equipment. In the latter case the subsequent installation of a dropped, paneled ceiling has the advantages of reducing operation costs (by reducing the space volume requiring thermal treatment), improving the acoustical conditioning, and decreasing illumination loss (through dispersion) by lowering light fixtures closer to the task level.

- In renovating buildings decisions on acoustical ceilings and classroom partition height are interrelated and entail tradeoffs. Single-height partitions to the acoustic ceiling level are cheaper, simplifying design and installation, particularly for buildings with sections of varying heights. Cost savings result due to the economies of purchasing a single-size item, and because the problems entailed in fitting partitions around ceiling ducts, sprinklers, wiring, and other machinery are alleviated. On the other hand, the undivided open plenum above the dropped ceiling can transmit sounds over a large area.

- As a general rule it is advisable to look for buildings with plenty of windows. If codes strictly provide that all instructional areas must have windows, it may be difficult to use the central areas of very large buildings (like some loft, industrial, and office buildings). Depending on the structure it may be possible to locate offices, storage, or toilet services there.

- If windows are not required by codes and a building under consideration has few windows, try to design common or public areas around windows so as to avoid competition for them.

- Despite codes and general human preference, windowless buildings have certain advantages: they must be air conditioned; their operation costs are believed to be less (due to less heat transmission and no vandalism costs in replacing windows); and distractions appear to be fewer and student and teacher attention more focused.

- The number and location of stairways and exits may be determined in large part by code considerations. Since stairways in particular are expensive items to add to a building it would seem advisable on the one hand to look for buildings which incorporate these features, especially in multi-story buildings. Stairways and exits also improve circulation. On the other hand, schools are increasingly finding security and control (both of outsiders and insiders) to be a problem that is exacerbated by stairways and multiple-entry points.

CHAPTER VII

EDUCATIONAL AND ENVIRONMENTAL PROGRAMS

Issues and questions raised earlier in the study pertaining to the relationship between educational programs and the physical environment are explored in this section on the basis of experiences and insights acquired from visits to 39 found space schools. Other issues which grew out of the visits are also explored and buttressed by examples drawn from these visits.[1]

Variety in Physical Environments and Educational Programs

Architectural and educational program variety among found space schools has been considerable as is apparent both from the earlier "Survey of Use of Found Space," and from the following list of schools visited during the course of this study.

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[1] Many of the examples cited in the sub-sections which follow are written up as case studies in considerably greater detail and are included in appendix H. Each example cited in the text which is the subject of a case study is noted as such in a footnote. The reader is encouraged to refer to these case studies for background facts, figures, specifications, and other details which support the conclusions and interpretations of the textual narrative.

Space Type	No. of Schools Visited
Church- and synagogue-related spaces	8
Supermarkets	4
Loft buildings	3
One-story industrial buildings	3
Bowling alleys	3
Catering halls and clubs	3
Offices	3
Showrooms and other commercial spaces	3
Art, music and other special institutes	3
Movie theater	2
Bathhouse	1
Armory	1
Prison	1
Bus	1

These found spaces have been used or converted in nearly equal proportions into self-contained classroom type schools and educational spatial program organizations of other types, primarily open space, as is summarized by table 8.[1] Of these 39 schools, 11 of the self-contained classroom type and 1 of the open space schools, for a total of 12, run basically traditional programs; that is, undifferentiated from other local or district schools in any way other than being an overflow annex. Six of the found spaces are used for special

[1]For a complete list of the schools visited by category, see appendix B-27.

TABLE 8

SPATIAL AND EDUCATIONAL PROGRAM ORGANIZATIONS OF FOUND SPACE SCHOOLS VISITED

Space Type and Use	No. Visited	
Self-Contained Classrooms		20
Traditional program	11	
Special Ed. and Vocational	2	
Non-traditional and experimental	7	
Open Space		15
Traditionally used (i.e., as classrooms)	2	
Special Ed. and Vocational	3	
Non-traditional and experimental	10	
Other		4
Vocational	1	
Non-traditional and experimental	3	
Total		39

education (i.e., programs for the handicapped and emotionally disturbed) and vocational education programs. Twenty of the schools have run experimental programs and/or programs with special distinguishing designations: alternative junior and senior high schools, bilingual schools, college-bound programs, nongraded and heterogeneously grouped schools, an educational museum, and other programs not describable by label. One other school was a bus, called the rolling pumpkin for its yellow-orange color, and was converted into a

mobile woodworking shop for children in northern Westchester County.

The survey of found space schools in New York State is probably more representative of large trends than are the school visits because the schools visited were not selected randomly but with specific purposes in mind, one of which was variety. The school visits, as well as the broader survey of found space use, inform about what has been done and thus what is possible. The school visits, of course, allow more poignant and specific observations and conclusions about what is desirable.

The vast variety of combinations of building types and educational program uses suggests that in converting found space to school use virtually anything is possible and more than likely has been tried. Regarding what is desirable - i.e., a combination of quality physical environments fitted to specific educational programs - generalizations are more difficult to reach. Specific conclusions on what type of building or which characteristics are preferable for which purposes are in the final analysis impossible to catalog definitively, as the following examples demonstrate.

BOCES and others have found specialized industrial type buildings often well suited for increasingly specialized occupational education programs, consistent with current vocational educational philosophy which favors accurate reproduction of actual work settings. Unless facilities are specially constructed most school buildings have neither the space, electrical service capacity, nor other provisions necessary

to support the specialized equipment needs of many career education programs. The Nassau County BOCES has undertaken one of the most ambitious conversions of this type. The Metro Media building in Westbury, Long Island, a 185,000-square-foot single-story industrial building, has been converted at a cost of $1 million to serve 43 different occupational educational programs, including general construction, cosmetology, baking, cooking, three kinds of auto mechanics, electronics, and ornamental horticulture, to name but a few.

Non-industrial buildings have also proved generally satisfactory for many vocational education programs. The Yonkers Career Center, with programs in carpentry, printing, television and radio electronics, practical nursing, and commercial skills, is housed in a former commercial office building. The Yonkers school has unanticipated advantages, such as air conditioning, a spacious woodshop, and a location central to its target population; it possesses some disadvantages also, such as excessive noise in some areas and poorly vented air circulation in others. Fumes produced from time to time in one area are carried throughout the building, requiring that the air conditioning and ventilation system be shut down. This problem, however, is not so severe that the school district feels compelled to rectify it, particularly since the building is rented, not owned.

The building mechanics class at the Yonkers Career Center constructed some of the spaces for other programs in the school, thus acquiring excellent on-site experience. This notion of on-site experience in education programs was the

reason for the selection of a frame house in Schenectady as the physical environmental setting for experimental programs in carpentry, home economics and homemaking. The building in this instance doubled fully as the subject and setting of the program. In such instances, of course, the shortcomings of the environments contribute to the challenge and educational value of the task.

The Bartram Commercial Annex in Philadelphia, formerly a supermarket, offers courses in office skills and practices, accounting, keypunching, and data processing. In contrast to the self-contained room arrangement in the Yonkers school, the Bartram Commercial Annex is an open space school. Despite initial problems adjusting to the open plan, the school administration, teachers, and students are now uniformly enthusiastic about the annex and its program. The five-minute walking distance from the main building is felt to be of adequate proximity. Carpeting and ceiling treatment provide acoustical conditioning which is sufficient to maintain a generally comfortable noise level. There is a problem in that the computer consoles, some two dozen keypunch machines, nearly 100 typewriters, plus calculators and various other office machines maintain a hum which often interferes with dictation, theory lectures, and the like. Diagnosis of this problem has pointed to the absence of any isolated room or area in this 9000-square-foot building which could be used for conferences, lectures, discussions or other purposes.

In this context it is worth noting that the Pennridge

High School Business Education program in Perkasie, Pennsylvania,[1] located in one portion of that school's converted girdle factory, has had almost precisely the same experiences as the Bartram Commercial Annex: the students and staff love the building and the open space, but with the extensive office equipment, they find the acoustical conditioning lacking for certain program needs.

Turning now to academic programs, both traditional and experimental types, there appear to be no consistent building types or characteristics which are always desirable or undesirable. Success seems to depend on the planning care and consideration involved, whatever the specific undertaking. The options with any one building are usually numerous. Industrial buildings, for example, can be suitable for academic as well as vocational programs. The Robie Ford automobile showroom and repair garage in Boston, for example, was converted into the Hernandez Bilingual School, an eight-classroom elementary school, with a special bilingual program; the former parking lot was transformed into a playground.[2] A four-and-one-half-story industrial loft building in New York City was also converted into a bilingual elementary school, P.S. 211.[3] In contrast to the Hernandez School, however, P.S. 211 has open space instructional areas and no outdoor playground. The students and staff of both the New York and the

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[1]See case studies, appendix H.

[2]Ibid.

[3]Ibid.

Boston schools are generally satisfied with their buildings, in each case finding aspects of their converted facility which they prefer to typical school buildings. At the Hernandez School they like the small, intimate size, the irregularly shaped classrooms, bright pastel colors, varied lighting, and the general cheerfulness, sturdiness, and newness of the building. The open space plan, carpeting, and relatively plush instructional areas of P.S. 211 are unusual in New York City schools, but there have been some sources of dissatisfaction as well. Since there is no outdoor playground and indoor gymnasium areas are also inadequate, play space is the major shortcoming in the physical environment of the school. Additionally, insufficient stairways, which have the added disadvantage of being terrifically noisy, a poorly balanced and slowly responding heating system, and a series of leaks, breakdowns and other problems with this rented building have done much to dampen the enthusiasm of the P.S. 211 staff.

Curiously enough, the open space areas of P.S. 211 tend to be used rather strictly for group recitation and instruction - that is, as traditional classrooms without walls - whereas informal and open program structures tend to occur within and occasionally flow between the physically self-contained classrooms of the Hernandez School. Such realities are useful reminders that there are limits to the influence of physical environment on educational program; physical environment is only one factor among many others that include administration, teacher preferences, styles, abilities, etc.

The variety of approaches and results possible in the conversion of buildings which are basically similar is well illustrated by the examples of three converted bowling alleys: P.S. 232 in the Bronx;[1] the Newtown High School Annex in Queens;[2] and, in Boston, the Dennis C. Haley School.[3] There are certain similarities in the two New York City conversions. Both are now two-story, air conditioned, windowless buildings with over 30 self-contained classrooms strung around a rectangular corridor. Each has one large, supposedly multi-purpose space to serve as cafeteria, auditorium, and gymnasium - as school authorities see fit. In contrast to the converted bowling alleys in New York City, where the windows were bricked in and interior partitions assembled to define classrooms, windows were cut into the exterior walls of the Boston bowling alley and it was converted into an open space elementary school. The Haley School also has a single large multi-purpose room. Part of the former parking lot was transformed into a grassy playground. At P.S. 232, in contrast, the muddy, litter-strewn former parking lot was repaved as an asphalt playground. The Newtown H.S. Annex, which houses the ninth grade of the high school, has no outdoor play space (the multi-purpose room is neither suitable to nor used as a gym), so recreational activity for students was postponed until a later year or for

[1]Ibid.

[2]Ibid.

[3]Ibid.

infrequent trips to the main school building a mile away.

The students and staff of both P.S. 232 and Newtown H.S. are dissatisfied with their building, although for different reasons, while the users of the Haley School are immensely pleased. The bowling alley now housing P.S. 232, an experimental program heterogeneously grouping fifth and sixth graders, is rented by the NYCBE. The renovation job, performed by the landlord, is characterized by shoddy workmanship and inferior materials. The heating, ventilating, and air conditioning (HVAC) system is poorly balanced and continually breaking down. Acoustics are terrible, with noise penetrating both horizontally and vertically throughout the building, and lights glare due to the absence of diffusers over the fluorescent fixtures. The list of failings goes on at length. The numerous problems related to this facility have resulted in disputes between the landlord and the tenant (NYCBE) over responsibility on matters which were not in all cases clearly defined in the lease. As these disputes have dragged on the students and staff of the school have suffered. Though not the fault of the landlord, the renovation plan of this building, which was prepared by the central office of the NYCBE, was also inappropriate for the educational program needs of this school. The staff feels an open plan or a more experimental facility would have been more appropriate than rectangular classrooms (which, it may be noted, are smaller than standard) for this experimental school with its heterogeneous groupings. Instead NYCBE authorities essentially carved up this bowling alley in the image of a traditional school

building - as far as funds and their imagination took them.

In converting the bowling alley for the Newtown H.S. Annex, beginning one year after P.S. 232 was completed, the NYCBE endeavored not to repeat the mistakes of the earlier project. They succeeded only in part. First, based on cost estimates at the time, the building was purchased rather than leased.[1] Where P.S. 232 is characterized by shoddiness and deterioration, Newtown incorporates more durable materials and higher environmental standards. For instance, in P.S. 232 poor fittings and sheet rock curtain walls which rise only as high as the dropped ceiling - not to the structural ceiling - are the major cause of the acoustical problem. Consequently, full-height asbestos-coated sheet rock walls were incorporated in the Newtown job. The adherence to high lighting standards, coupled with barren walls and the absence of windows unfortunately has resulted in an environmental feeling of antiseptic sterility which one teacher called unrelenting.

Somewhat incongruously, despite their building's shortcomings, the staff of P.S. 232 are unusually enthusiastic about the school while the students and staff of the Newtown Annex appear to resent their program and, by extension, the building. Though clean, new, and physically more attractive to most teachers than the deteriorating and dingy main building of Newtown H.S., the newly converted annex tends to be viewed as a one-year stopping-off point (as it is in fact for the ninth graders), geographically remote from the main

[1]The cost projections of this study indicate their decision in this instance was correct. See page 170.

building, and equally remote from its organization with respect to support, supplies, and equipment (a relationship characterized by a teacher as that of a "forgotten second cousin"). Administration here reflects on facilities with negative effect. Conversely, more successful examples may also be, in part, a reflection of administration.

For example, the Haley school, unlike its New York City counterparts, sparkles environmentally: the design is clean, functional, stimulating, and comfortable. The only complaint of the staff concerns the lack in the renovation plan of small group rooms adjacent to open spaces for discussions, private consultations, and the like. The state code window requirement, however, was the controlling factor in this aspect of the design. The Haley School is unique in Boston in that it is the only small-size (380 pupils) open plan school. Its ungraded program is also special, with admission by parental request rather than neighborhood assignment. The school's success is reflected in the fact that it is racially integrated (in racially troubled Boston) and has a waiting list of over 150.

In summary, these examples illustrate the potential variety in the approaches to conversion, the uses, and the successes of found space for education purposes. Given the myriad options and combinations of student age levels, program needs, space requirements, and staff and student preferences, it is impossible to pre-specifiy what kind of building or characteristics should be sought. Found space is not an

inherently viable solution to school facility needs. Depending on how each situation is handled, the physical environment of converted buildings can be a positive, negative, or, more likely, mixed solution to school needs. Some subtle implications of this fact will be revealed in more detail in following discussions.

Adaption and Innovation Through Found Space

A question set out earlier in this study is whether fixed features and other constraints of found buildings are more likely to promote modifications and innovations in educational programs and physical environments or whether found buildings tend to undergo modifications to meet conventional specifications. Both outcomes have advantages and disadvantages and deserve respect as valid approaches to school facilities acquisition. Nevertheless it is important to know whether found space can be modified to specific program conditions or whether one must generally be prepared to sacrifice certain objectives in order to adapt to the space.

It has been reasoned that a willingness to use found space for a school, for emergency or other reasons, coupled with the explicit constraints inherent in any existing building, would naturally result in or even necessitate program reconsideration and, consequently, greater imagination and adaption. The school visits revealed, however, that adaptive patterns frequently occur but are not a necessary facet of found space conversion. Actual experiences run the gamut

from extremes of adaptive educational and architectural program creations within the constraints of a building, to extensive building modifications to meet pre-established program specifications, with a complete spectrum between the two extremes.

The annex to P.S. 26 in the Bronx, more commonly known as Burnside Manor, which was the name of the catering hall it took over, is among the most famous and in many ways, the most successful found space conversions.[1] A capsule review of its unusual history illuminates the difference between the two approaches toward building and program modification. The NYCBE initially planned to gut and remodel the catering hall with the self-contained classrooms of a traditional school building, but hesitated because the renovations would have cost an estimated $400,000. When the concept of open classrooms was introduced into the discussions, planning was renewed and the NYCBE instead rented the building "as is," spending less than $30,000 on renovations - for the addition of panic-release double doors, modifications to the kitchen, and other minor items to meet minimum code requirements. Basically unchanged and fully air conditioned, the building's four chandeliered, carpeted, mirror-walled ballrooms now serve as open space classrooms.

The building is not without its constraints, some but not all of which have been incorporated into the school's program. For example, due to spatial constraints of the building the corridors have been adapted for mini-gymnasiums. Cargo nets, rope ladders, climbing bars, and various unlikely

[1] Ibid.

structures have transformed the space into a compact and highly functional gym - one that can be used spontaneously in an informal school program and not regulated necessarily by a strict schedule. Teachers and students appear to love the luxury, informality, and anti-instructionality of the space, aware of but adapting to excessive noise and poor lighting. Board of Education engineers, custodians, and others, however, tend to be highly critical of the building, criticizing its wood and masonry structure (i.e., not of steel and in the so-called "fireproof" classification), the substandard lighting levels, electric circuitry problems, and problems of maintaining and cleaning carpets and velvet curtains. Large glass mirrors are also viewed as potentially dangerous to elementary school children. The unconventionality of the building causes special concern to the custodian, who finds that irregular-sized light bulbs, fuses, and other replaceable items and supplies are not stocked by the Board of Education.

One of the most unusual and creative found space projects investigated entailed the conversion of the balcony of a New York City movie theater into an educational museum, variously called the "Ethnic" or "Heritage" museum. At the Fairmont Theater in the Bronx, with state funding and various grants from foundations and city agencies, the original concept of an educational museum which would explore the cultural roots of the children throughout the community school district entered into a dialectic interplay with the physical constraints imposed by the stepped balcony. The end result represents not so much adaption as enrichment and harmony

of the educational program and the physical environment. Both underwent extensive modifications which transformed them into something greater. Entering this museum is entering a unique rld, drawn in, around, and through varied spaces, levels, and attractive vistas. Media shows, exhibits, performance areas, work spaces, and a planetarium have been designed to stimulate and provide the opportunity for children to investigate science and their enthnic roots. The sloped balcony, which might have posed an insurmountable handicap, was used to advantage as the guiding spatial tie unifying the various themes of the museum. The design enhances the excitement of the exhibits.

Although there was considerable planning of some elements in this dramatic and unique educational museum, there was no comprehensive plan. Much of its character simply seemed to evolve. The drawbacks of the conversion relate primarily to the cost and time involved. Even incomplete cost figures indicate that the ethnic museum was exceedingly expensive relative to conventional school space. Planning and construction took three years and cost approximately $300,000, not including exhibits - which cost about $120,000 more. In addition, expenses must be covered for operations and maintenance and rental payments on the museum's portion of a ten-year lease (shared by a 120-pupil open space elementary school and community school district offices in the building), only seven years of whic emain for museum use. With a capacity of approximately 75 pupils at any one time, the costs amount to over $500 per pupil per year and over $7 per square

foot per year for the construction component alone. It may, however, be noted in this connection that the cost of construction was unexpectedly and substantially increased when it was discovered, during demolition, that a major steel column was two feet off its location according to the old plans. Furthermore, as an innovative museum, with a unique kind of educational value, its construction costs are really not comparable to those of most school buildings.

The "Block School" in Brooklyn, now an annex to P.S. 219 and used as a kindergarten, is another example of a highly adaptive and innovative program, both educationally and environmentally.[1] Located in a former synagogue (and before that a supermarket) the Block School was originally established as an experimental program for preschool children, funded for three years under a Federal Title III ESEA grant. The colorful, multi-level renovated space is characterized by variety for a program that focuses on diverse centers of activity, each of which is designed to be attractive to children, encouraging them to inquire in accordance with their own interests and discover at their own pace.

This school is felt to have had, in some measure, a vitalizing and stabilizing effect on the neighborhood. The quality of the program, the parent involvement component, and the fact that a vacant and boarded-up old building was converted into an unobtrusive but exciting school, are all factors contributing to this success.

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[1] Ibid.

The Acorn School, a private school with a Montessori philosophy (for preschool to upper elementary grade level children) is another architecturally innovative conversion. The Acorn School rents the ground level commercial space of a low- and middle-income Manhattan apartment tower. The charm of the basically simple, open space design is in the detail and the unlikely selection of furnishings, which have proved unusually flexible and functional. Light aluminum contractors' scaffolding, on casters, the basic furniture module, has been rigged with chalkboards, display boards, benches, storage shelves, etc. and used for space dividers, climbing tree houses, and private cubbyholes, among other uses. Other "found" items include industrial type plastic storage bins, clamp-on spotlights (in addition to florescent lighting), hospital cubicle track suspended from the ceiling, and "self-healing" vinyl wall coverings for tackboards.

In contrast to the favorable neighborhood experience of the Block School, the Acorn School has suffered from what it finds to be a hostile environment. The Acorn School students are mostly from upwardly mobile middle-class families who live outside the immediate neighborhood in which the school is located. Repeated acts of vandalism and minor disruptions are believed to express resentment by local children who are excluded from the school.

Of course, not all found space conversions have been as innovative and unusual as the above examples and the found space alternative would be severely limited if such qualities were obligatory. Not everyone wants such unconventionality

in a school. In some situations a traditional school environment is more appropriate to the needs and desires of the users.

Three examples of more traditionally conceived found space conversions are found in another annex to P.S. 219 in Brooklyn, located in a former supermarket; in Philadelphia's Harrington Elementary School School Annex, previously a coal company's office building; and in the Olney H.S. Annex in a federal government arsenal and testing laboratory, also in Philadelphia. The P.S. 219 Annex and the Harrington Annex lack adequate gymnasium facilities for the older children. In emergency circumstances the cafeterias of these buildings serve this purpose, but generally physical education is taken at the main building (three blocks away in the former case, directly across the street in the latter). In most other ways these two buildings and the Olney Annex, at least on the inside, resemble typical school buildings.

In each case there are small variations from the prototype of a traditional school building, some appearing as shortcomings and others as advantages. An inoperative intercom, small room sizes, inadequate closet space, insufficient display boards or wash basins in art areas or electrical outlets per wall, and drab wall or floor colors are staff complaints in one or another of these schools. The special advantages of the Olney Annex include air conditioning, larger than average classrooms, and some special audio-visual equipment setups. The staffs of the two elementary school annexes generally prefer their buildings to the main school because of the small size - each has about 270 students and

nine to ten classrooms - the intimate family-like quality, and the relative independence from school administration.

Parenthetically it may be noted that prior to conversion the supermarket which was remodeled into the P.S. 219 Annex had been burnt out in a fire, was boarded up, and was a blight on the neighborhood. The renovation of the building to a school reversed this effect.

These examples help to illustrate the fact that found space is a potentially suitable school facility alternative for conventional as well as alternative programs from both an educational and an environmental point of view.

Of special interest to this study, however, are the cases in which educational program innovations have come about due to unusual found building characteristics or as compensation for apparent shortcomings, i.e., cases of positive adaption. The unique corridor/gymnasium of the P.S. 26 Annex, Burnside Manor, has been cited earlier. Another unusual setting for a school is the portion of a bathhouse in Boston which was converted to an annex for the South Boston H.S. Its location next to the water, on a sand beach, moreover, has enabled the school to offer a unique physical education program. Also, science classes have focused extra attention on issues related to oceanography and water ecology. The above mentioned Hernandez Bilingual School, one of the outstanding examples of a basically traditional self-contained classroom approach to conversion, has also turned to advantage unconventional elements. For example, several of the classrooms are irregularly shaped or have leftover alcoves. Such spaces have

served well for special interest exhibits and activities, private cubbyhole retreats, small discussion areas, and the like, and in this regard have complemented and encouraged teacher attempts at informal classroom programs.

At P.S. 232, also discussed above, the relatively low, nine-foot ceiling of the multipurpose room placed severe constraints on gym activities. Consequently the school developed an indoor physical education program that stresses non-ballplaying activities (e.g., dance, body movement) and the staff proudly proclaims their gymnastics program the finest in the city.[1] In addition, the inherent shoddiness of the renovation has contributed to the relaxed attitude of the school's administration and staff toward the decorative use of the building. Unlike most schools in New York City in which decoration and display must follow strict rules, at P.S. 232 each teacher is encouraged to do whatever he or she wants with the room. As a result, different classrooms reveal distinct personalities through painted full-wall murals, hanging paper displays, landscapes viewed through painted windows (compensating for the lack of fenestration), and the like.

Sometimes, of course, the process operates in reverse: adaptive intentions succumb to physical features. P.S. 211, discussed above, is an open space school, yet the program functions as if the building had classroom walls. In a much

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[1]Students need little encouragement to show off - especially for visitors - abilities to do standing flips, or walk through corridors on their hands, etc.

more obvious way the same thing occurred in the vast open, skylighted industrial space used as a ninth grade annex to the Lowell High School in Lowell, Massachusetts.[1] Although the space is well suited to an open plan, five-and-one-half-foot high temporary partitions have been located along a rectangular grid, indisputably defining classrooms. Environmentally, this approach results in the worst of both systems because the self-contained classroom instruction is easily distracted by noise and visible disruption elsewhere.

The experiences and insights in the use of an ex-factory building on Fifth and Luzerne Streets in Philadelphia are instructive. The Pennsylvania Advancement School and the Intensive Learning Center are two experimental programs (among several) which have used this building, which henceforth will be referred to as the "PAS-ILC."[2] Although the school is based on open space programs, the students and staff have tended to allow the rectangular grid organization of columns to influence too strongly their use of space. The rectangular bays between columns have enormous power in defining space use. A kind of territoriality has resulted which conflicts with team teaching and other program objectives. Preliminary experiments with graphics, symbols, and color changes are now underway in an effort to break the psychological power of the grid.

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[1]See Case studies, appendix H.

[2]Ibid.

Even positive examples of adaption, however, cannot fully compensate for inferior educational facilities. Its positive features notwithstanding, it is hard to view the P.S. 232 conversion as anything but inferior - interfering with the educational program more than supporting it.[1]

Other found space schools have been even less fortunate. In the case of the William Taft H.S. Annex,[2] converted from a catering hall (and before that a bowling alley), for the "College Bound" program of the high school, the staff has discovered few ways to capitalize on the inferior physical environment. In many ways this project resembles P.S. 232. Also located in the Bronx, the Taft Annex's wood and masonry construction was mostly gutted, windows bricked in, and the interior fashioned to resemble a typical school with smaller than average, self-contained classrooms, dropped paneled ceilings, and linoleum floors. Shoddy workmanship and inferior materials characterized the renovations, which were performed under the auspices of the landlord (in this case Columbia University) at an estimated cost of $400,000. Environmentally

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[1]For example, a curious student one day climbed up through a missing acoustical panel into the plenum above the dropped acoustical ceiling. He explored through the plenum, supported by the dropped ceiling, to an adjacent classroom when another acoustical panel gave way, and to the surprise of teacher and students, he literally "dropped in." Thus aside from poor acoustical properties, classroom walls which rise only as high as the dropped ceiling may also contribute to other instructional disruptions. (P.S. Nobody was hurt in this incident.

[2]See case studies, appendix H.

the building functions badly: no windows, a drab and peeling interior paint job, small cell-like rooms, poor acoustical conditioning, and air conditioning continually on the blink - with the landlord and tenant unable to agree fully on who is responsible for fixing it. Indeed, such disputes between the landlord and the central Board of Education have been characteristic since the building opened as a school in 1970. At that time the principal prepared a checklist of 34 items unfinished, missing, or inoperative. Some of these still exist.

In summary, the general survey and the school visits suggest that educational program and physical environment innovation and adaption are common in converting found space for educational use. Some of the more creative examples have been described. Creative adaption, however, is neither inherent in the process nor essential for a satisfactory result in the conversion of found buildings, any more than it is for the planning and construction of a new school building. Found buildings can often be modified to meet preestablished specifications. Successful adaption probably comes about through a combination of factors such as individual insight, planning, chance, luck, and a positive and open disposition toward change. Neither the found space alternative, however, nor an adaptive approach to it necessarily assure a school environment of high quality. There are good and bad results in found space school buildings, as in any other kind of school facility. Thorough planning and careful judgments are advisable in every case as the best assurance of a quality

educational facility. Some insights and examples relevant to communication and user participation in the process of planning are the subject of the next section.

Planning: The Role of Participation and Communication

Care, attention, and common sense are important at every stage and level of the planning process. Many factors fundamental to the planning of school facilities can benefit from professional experience and know-how. Issues concerning financing, legalities, building condition, and environmental design and construction, for example, can be technical and complicated beyond the capacities of the layman. An appreciation of these factors and the importance of professional assistance, however, should not lead to the abnegation of more local responsibilities. Although a sensitive and intelligent designer can do much to realize the delicate balance between the educational program and the physical environment, his professional efforts can be severely jeopardized if clients and users are not involved in the process. If communication channels are not open or if officials ignore user input, the project is bound to run into problems.

P.S. 232, discussed earlier in this chapter, is an example of how uniformly poor planning and neglect on the part of school authorities can override positive intentions and efforts at client involvement. The project was initiated by local parents who were concerned about crowding in their neighborhood elementary school. After years of increasing over-utilization, the school was being forced to turn to double

sessions, a condition apparently commonplace to school officials but unacceptable to the parents. The parents developed and pushed the project for an additional facility every step of the way: argued the need, considered alternatives, located the building, secured the series of city approvals, and planned the structure of the innovative educational program. After several changes, it was decided the new found space school would be for junior high school students, thereby relieving overcrowding in several schools. Where NYCBE officials slacked on responsibilities, parents filled in. To their everlasting regret, the one point at which the parents neglected to review NYCBE action was in the physical planning and renovation of the existing building. The inferior results of that aspect of the project have been described in detail earlier. Ironically, not only is the building unsatisfactory for the heterogeneously grouped educational program which was planned, but upon inspection subsequent to construction work the building was also deemed unsuitable for the mandated junior high school curriculum. Thus, school officials hastily redesignated the building as an experimental school for fifth and sixth graders. This case is a startling example of the fact that general incompetence of officials can negate even the most enthusiastic and responsible cooperative efforts of concerned citizens.

As was noted earlier, the Central Board of Education learned from some of their mistakes in P.S. 232 when they subsequently undertook the conversion of the Newtown H.S. Annex:

costs were projected and more attention was paid to construction. But local participation in physical program planning was again discouraged and this, perhaps, contributed to student and staff resentment. Also important, placing the ninth grade together and separate from the mainstream of the high school appears to have aroused negative sentiments in the ninth graders. The first year of high school is an important transition for teenagers, filled both with expectations and problems. Isolating ninth graders and postponing their integration into the mainstream can increase anxieties and deflate enthusiasm. Such sentiments are infectious.

It is interesting to note parenthetically that the students and staff of the Lowell H.S. Annex and the South Boston H.S. Annex, both of which house ninth grade students only, also expressed resentment about their separation from the main school building.

Problems often occur because there is a lack of communication at some vital point. A perpetual problem in large educational systems such as New York City's, for example, is that special offices of the Board of Education are responsible for the planning and building of schools, leaving little opportunity for input into the planning by the students, teachers, principals, or custodians who will use the building.[1]

Indeed, the staff is rarely hired or assigned until the new or converted building is complete or almost complete. Staffing is not regarded as part of the planning task, nor is

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[1]See pages 93 - 94, and appendix E.

planning regarded as a legitimate concern of staff. The renovations of P.S. 232 were completed in April but the new principal of that school building was not hired until mid-July, leaving only six weeks to hire staff and prepare for the beginning of school. The principal of P.S. 211 was somewhat more fortunate. Hired in late December, she had almost nine months to prepare. Since construction work on the building had begun several months earlier, however, there was little opportunity for her to influence plans for the building.

In contrast, the participation by users was extensive in two very exciting New York found space schools. The planning of the Block School in Brooklyn, described above, included active involvement not only of staff, but also of parents. Since the federally funded program actually operated out of a home basement until the found building was ready, the staff and parents had continuous opportunities for participation and supervision of their project, resulting in an exciting physical environment and educational program. Yet, planning broke down and problems arose when approvals were required, payments were due, supplies were supposed to be delivered - i.e., at most areas of overlap with the NYCBE, which was the official fiscal agent and administrator of the project. Continuous disputes, delays, money problems, and poor long-term financing decisions resulted from such administrative inattention, poor communication, and lack of a long-range plan.

In the conversion of commercial space for the private Acorn School, also discussed above, an unusual element was

added: student involvement. The architects asked the elementary level children to draw pictures. Ideas expressed through the drawings were then incorporated into the design of the school. For example, the thought of using aluminum contractor's scaffolding for multi-purpose furnishings was inspired by numerous drawings of treehouses. This example is suggestive of the potential benefits of involving even very young children.

For many reasons user involvement in planning is not always possible. Personnel turnover is one factor; circumstances and the constraints of existing operations are a reality which new staff must adapt to. Furthermore, it is realistically impossible to include all users equally in the planning process. When user participation does prove impossible, it becomes even more important that planners foster communication of their intentions, rationale, procedures, and the like.

Problems which superficially appear to arise from shortcomings in the environment may in fact stem from lapses in communication. At the open space Dennis Haley School, for example, staff has complained about insufficient display surfaces and about the lack of enclosed areas. The former complaint regarding display space is a perfect example of good intentions cancelled out by lack of communication. To maximize the amount of area for display, the architects selected magnetized partition walls for the building, to which pictures could be fixed by small magnetized tags: the purpose

of the tags was not explained, however, and the many boxes of them which were provided to the school remained locked unused in the closet.

The latter problem, regarding lack of enclosed areas for student instruction, is compounded by the feeling of teachers that the low height of the furniture/room dividers increase visual distractions for children. In actuality plans for enclosed areas were constrained by window requirements of the building code; furthermore, architects selected the height of the furniture deliberately, with the scale of the children and their needs in mind. In fact, distractions apparent to an adult are not even visible to an elementary school child. Concerning each of these issues, as well as other features of the design, the architect should have explained the rationale and constraints. Alternatively, the staff might have contacted him with questions and requests for explanations. When such a dialogue is lacking, as it nearly always is, each side tends out of ignorance to denigrate the motives and intelligence of the other party.

Indeed, open communication channels are important at every level, as much after the school building opens as during planning. Not only should decisions, rules, and procedures be clearly communicated - and frequently they are not - but so too should the rationale on which they are based. Too frequently, for example, custodial, teaching, and administrative staff view themselves as having separate allegiances rather than as working together on the same team. To

illustrate this point, in several schools visited during this study it seemed that an open exploration and discussion between custodial and teaching staff on the working of the heating system would increase understanding, appreciation, cooperation, and, over the long run, efficiency by decreasing resentments and time-wasting disputes. Too many teachers view custodial requests and rules as bureaucratic bothers. Custodians, on the other hand, frequently assess school buildings only in terms of operations and maintenance efficiency and durability. Many, for another example, think carpeting is a mistake in schools solely because it takes longer to clean each day than hard floor surfaces. The value of carpeting in an educational environment from a teacher's point of view is not yet clear to custodians.

In New York City this kind of rift among personnel is replicated at the higher level of agencies and offices within agencies. Partly due to diverse pressures such as additional space demands and limited budgets the School Planning and Research Division of the NYCBE, the office responsible for initiating and planning school facilities, has tended to try to minimize the cost of alterations and repairs, particularly for leased buildings. Maintenance and operation of school facilities, however, is the job of the Maintenance and Operation Division within the NYCBE, which complains that the SPRD policy of minimum alterations and repairs results in excessive work and expense which their division must bear, exceeding the resources of their staff and budget. They further argue that the policy and practices of the SPRD are more expensive in the

long run.[1] Thus each division regards itself to some extent as the opponent of the other, a competitive situation which works to the detriment of school planning on the whole.

Other factors often associated with found buildings can affect attitudes and feelings about the building environment and the educational program. Found space has often been appropriately selected for alternative educational programs for which the institutional associations of a conventional school setting would be viewed as constraining. The Bartram Human Services School, located in a church in South Philadelphia, is one of many cases in point. This federally funded alternative program for high school students integrates classroom instruction with service experiences in hospitals, universities, and other local institutions. Officially but distantly affiliated with a traditional high school (about two miles away), the students and staff seem to feel that the characteristics and shortcomings of their church basement are a contributing ingredient to the spirit of the program.

In numerous other conversions, such as Burnside Manor, Dennis Haley, and even the otherwise unsatisfactory conversion of the William Taft Annex, the non-institutional character of the found space was cited by staff as an advantage. In other cases, however, the non-institutionality of found buildings is viewed as a definite disadvantage. Those who function best in a traditional school building or who identify with its symbolic qualities may equate a recycled building with inferior

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[1] Office of School Buildings, Division of Maintenance and

treatment. Such sentiments were expressed, for example, by people at the Newtown H.S. and the Lowell H.S. Annexes, as well as by some central office school officials consulted during the course of this study.

It appears, however, that resistance by students and staff to non-institutionality and some of the shortcomings of found buildings are often minimized when the found building houses an experimental or special program. Nearly two-thirds of the schools visited in this study had some special program designation, including: College-Bound programs, bilingual schools, special occupational program centers, a range of alternative or "free" schools, and others less succinctly classifiable. In these schools there seemed to be more acceptance of the unique nature of the building as well as more willingness to work around shortcomings in the physical environment.

Several factors are probably pertinent here. For one thing, in many cases a self-selection process operates for staff and students who choose an experimental program. Also, in special programs, the focus on the unique features of the program may help compensate for annoying distractions, although clearly, a good physical environment is preferable to the necessity for compensations. Regardless, it is important that special program designations be substantive and not merely superficial designations. Labels and perfunctory programs of whatever nature will not be sufficient.

Operations, Memo, November 20, 1972, and interviews with NYCBE staff.

Summary

The sections of this chapter use examples which substantiate the ways in which found space conversion can offer unique opportunities for the reconsideration of educational programs and the development of physical environments. At the same time, the warning encountered often in this study - that each case of found space use must be considered for its own qualities, merits, and vulnerabilities is also apparent. The sections on variety, on adaption and innovation, and on participation and communication attempt to give planners an awareness of the multiple factors to be considered in suiting the educational program and environmental program of any projected facility to its intended purposes. No one formula can be expected to suit all situations.

Nevertheless, the range of what is possible has certainly been demonstrated by what has been done, and there are some lessons to be drawn from those experiences. As in chapter 6, on codes and renovations, a list of specific guidelines emerging from experience is presented below with the hope of adding to an eventual body of lore on the use of found space.

- In planning open space facilities consideration should be given to the allocation and design of smaller contained spaces for conferences, small group instruction and discussions, and other private tasks.

- Spatial characteristics which resemble (or partake of) a grid - like column placements, fixed walls and furniture, carpeting and lighting patterns - even in open space designs can exert a powerful influence on space use patterns,

typically resulting in confined and defined rectangular territories. If the objectives of an open space plan are flexibility, exploration, cooperative interchange, or the like, special efforts may be necessary to inhibit the growth of individual teacher or class territories. Simple measures like supergraphics on walls and paneled ceilings, bright and varied color highlights, furniture placement, and other measures which emphasize diagonals and curves can create movement and break up personal territories. Similarly highlighting exposed ceiling ductwork, changes in floor levels, and semi-permanent curved or angular partitions provide means to the same end.

- Conversely, many of the attributes of self-contained classrooms can be created in open spaces through non-structural or limited structural means.

- In designing interiors of educational spaces for young children, consider their visual and spacial perspectives in decisions regarding the scale and height of permanent and movable walls and space dividers. What may feel like distractions or incursions on privacy to adults, particularly in open space, may be unnoticeable to a child with a lower line of vision.

- Irregularly shaped rooms and rooms with small or odd leftover spaces can have special advantages. They are particularly conducive to use as cubbyholes and conference or individual work areas, particularly for open classroom or interest area program arrangements.

- Physical education and physical exercise do not

necessarily require separate rooms and facilities or high-ceilinged spaces. Many schools, especially for lower grades, lacking traditional gymnasiums, are finding ways to more nearly integrate physical activity into the instructional program with climbing and balancing equipment, tumbling mats, ropes, and various other kinds of attractive equipment. Other schools lacking high-ceilinged gymnasiums are emphasizing non-ballplaying activities: dance and body movement, gymnastics, and other activities which stress muscle tone and coordination.

- Found space can be used for a variety of programmatic approaches other than traditional school facilities, such as school annexes, special purpose centers, home base centers, neighborhood rejuvenators, and community and educational service centers. For a fuller discussion of these possibilities, see appendix I.

CHAPTER VIII

COSTS

In difficult economic times decision-makers tend to pay a great deal of attention to costs, sometimes disproportionately so. In this connection, cursory reasoning has often led to the conclusion that found space conversion would be cheaper than a new school building - because acquisition costs of vacant sites are so high or because existing structures and physical systems would result in lower construction costs than a new school building or for some such reason. Even when the alternatives are being questioned by those trying to reach a decision between found space and new buildings, questions tend to concern only costs: Is found space conversion cheaper than a new school building? In what kinds of buildings, with what age structure, under what set of conditions is conversion cheaper?

Cost analysis of 23 found space schools visited in this study leads to the overriding conclusion that each case must be examined and assessed separately. With some exceptions, as will be noted shortly, generalizations and thumbrule guides are poor equipment for cost assessment and planning of the conversion of found space.

First, however, let us recall that the determinations of school building economics, as described in detail in Chapters II and III, are based on building life use costs, not merely

initial acquisition costs. Because initial acquisition costs are not necessarily proportional to long-term cost, because initial capital outlays do not take into account the discounted value of future expenditures, and because the relative cost of buildings with different life expectancies and different financing cannot be compared based on initial acquisition costs, the alternative cost analytic model based on present value formulas was devised.

In this analysis two kinds of total building costs were examined: (1) the total cost outlay for the building during its entire life use as a school, hereafter called "total building cost"; and (2) the average annual value of the facility per unit - either per square foot or per pupil - based on the total building cost, hereafter referred to as the "annual square foot value" or the "annual pupil value" respectively.

The total building cost represents the bottom line of all income and expenditures, discounted to present value, that are attributable to the building. It is the best measure of the total cost of alternative school building projects to a municipality when the building life expectancies and pupil capacities of all the alternatives are equal to or greater than the projected space needs. That is, for those alternatives which meet space and longevity needs, total building costs may be compared to determine which is cheaper.

When the life expectancy or pupil capacity of one or more school building alternatives is less than the determined need, the annual pupil value and annual square foot value provide comparable measures of annual average unit costs.

These provide, for example, a basis for comparing a short-term leased building to a long-term newly constructed one when an indeterminately long space need is projected.

The reader should bear in mind that the analysis here focuses on the lifetime cost advantage of found space schools versus new school buildings compared on the basis of common pupil capacities.

Turning now to the cost analyses, the projections indicate, as summarized in table 9, that of the three alternatives -i.e., conversion by lease or purchase of an existing building or construction of a new school building - the total building cost generally was lowest for leased buildings. This is not surprising. To understand this result it is important to recognize that each analysis was based on the actual number of years of life use of the building alternative chosen - an average of 10 years for 13 cases. 12 of which were leases of 15 years or less. Based on an average 10-year use, the total building cost of leased buildings averaged 47 percent of projected new school buildings. This essentially confirms conventional wisdom that for short-term space needs rental is usually the most economical alternative. It is worth noting, however, that there are exceptions. Purchase would have been cheaper in three of the cases. Further, based on an average 26-year use the total building cost of purchased buildings averaged 72 percent of projected new school buildings.

Straightforward reasoning dictates that new school buildings, with typical life expectancies of 45 years,[1] are not

[1]Based on information provided by Manufacturers Appraisal

TABLE 9

RELATIVE AVERAGE TOTAL LIFETIME COSTS OF FOUND SPACE FACILITY ALTERNATIVES (in Percent)*

Alternatives Compared	Average Number of Years of Use	Percent	(Number of Samples)
Lease as Percent of New	9	47	(12)
Purchase as Percent of New	26	72	(10)
Lease as Percent of Purchase	11	88	(12)

*The data on which these summary averages are based are included in appendix B-28

economically feasible for short periods of need since the heavy initial capital investment must be amortized over time. For seven of the cases total building cost projections were made with variations in the number of years of life use, in an effort to determine if any economic pattern exists relating number of years of space need with school facility alternative. The results are shown in graphs 1, 2, and 3.[1] The graphs illustrate, although less dramatically than had been expected, that with increasing periods of life use, the relative cost of lease and purchase as a percent of a new school

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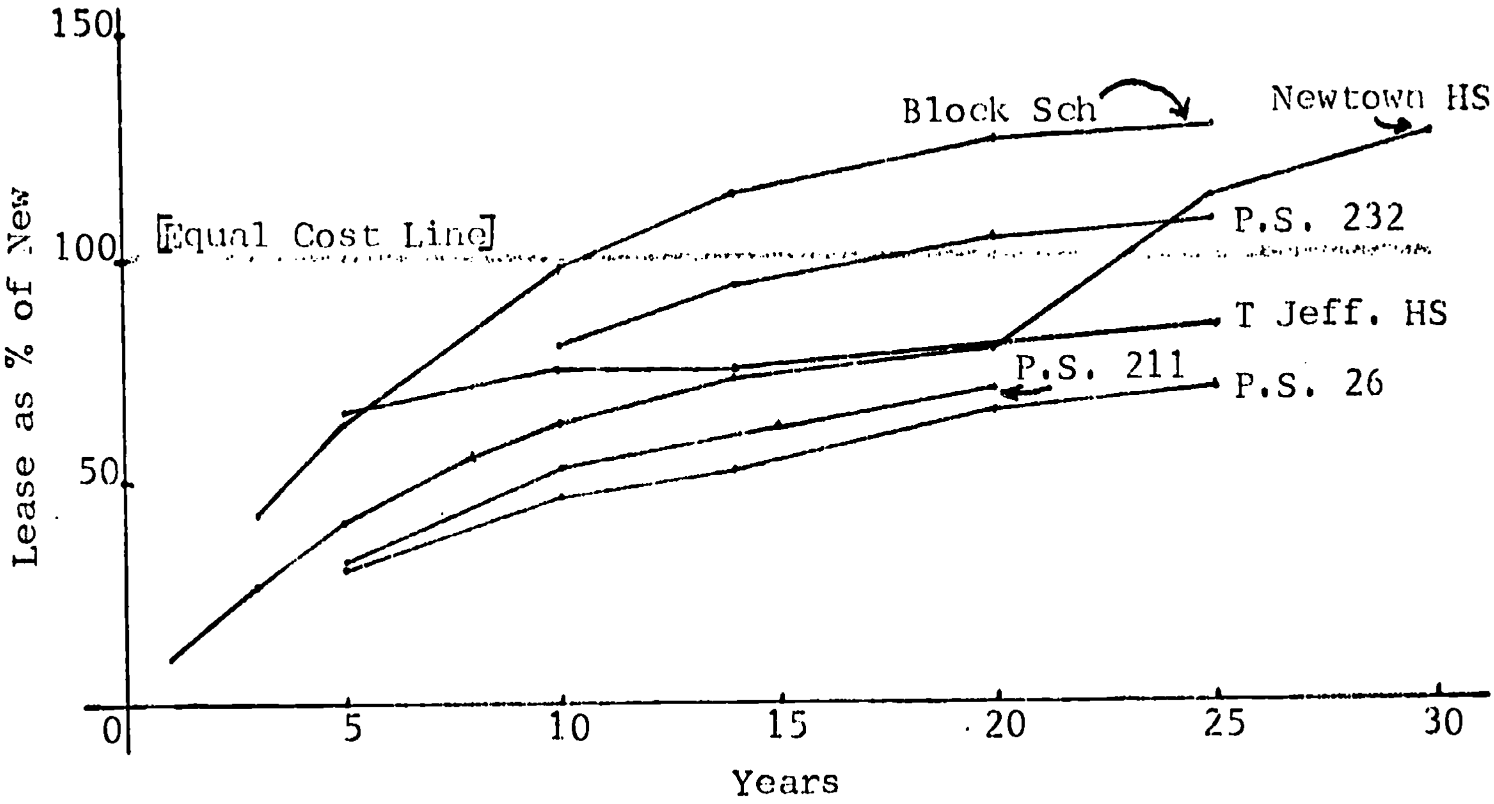
Co., Philadelphia.

[1]The data from which these graphs are drawn can be found in appendix B-29.

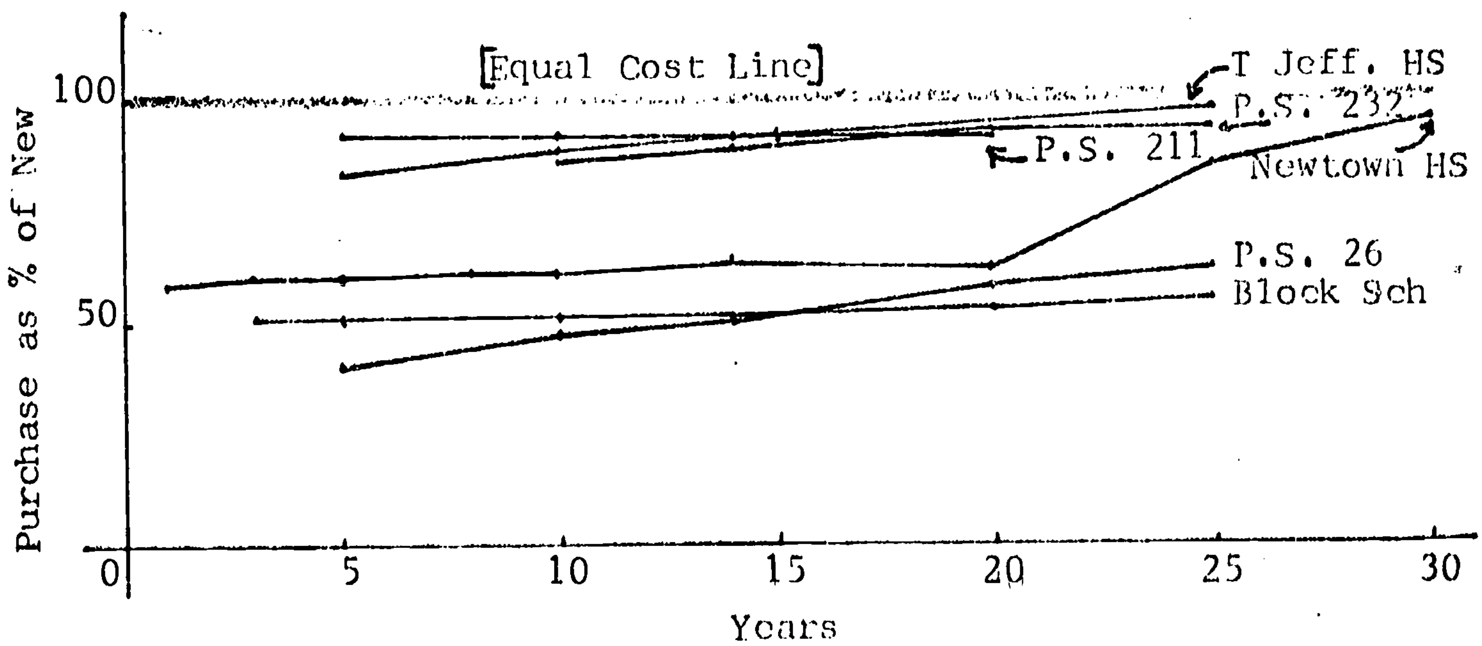
GRAPH 1

RELATIVE LIFE USE COST: LEASE VS. NEW*



GRAPH 2

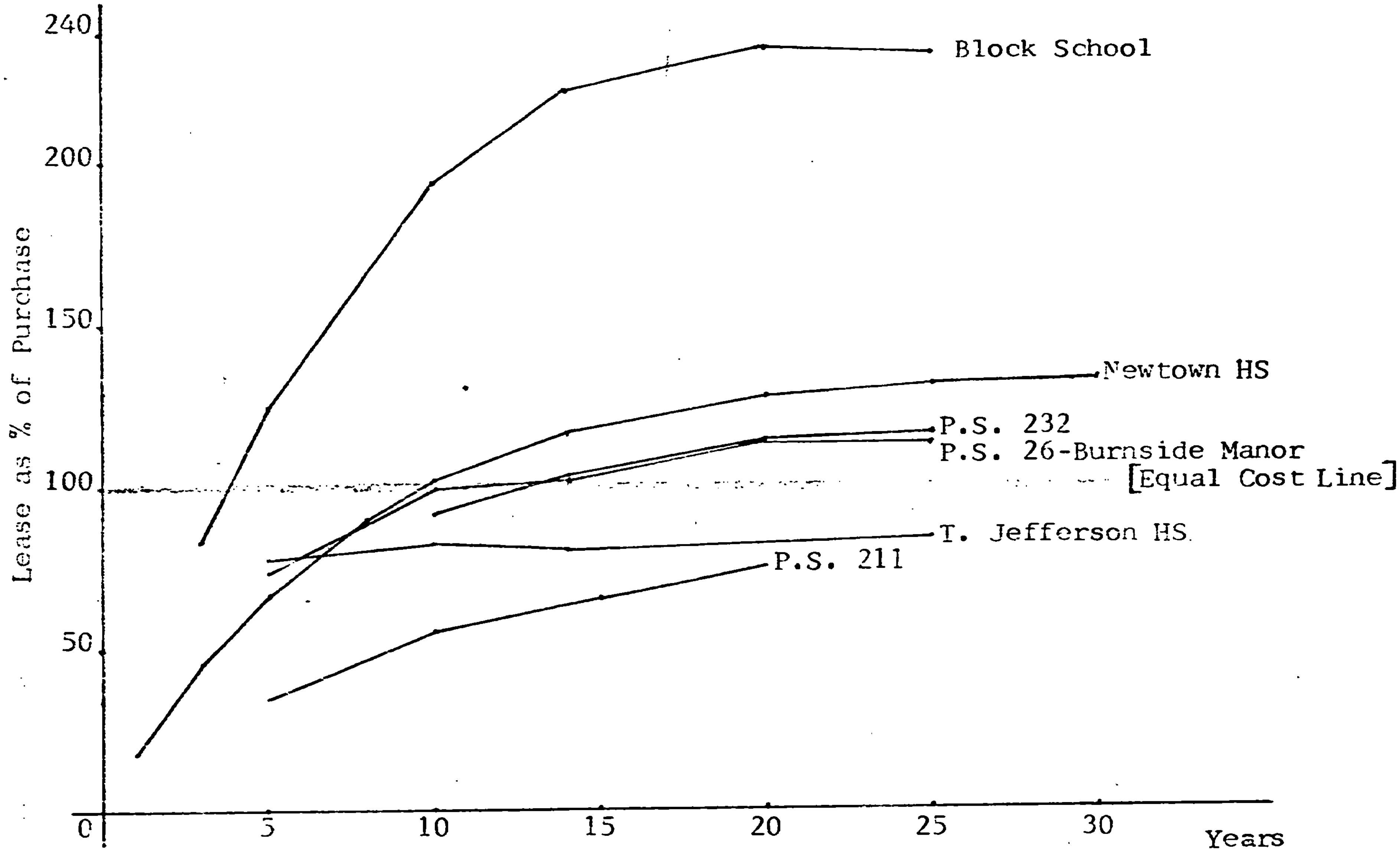
RELATIVE LIFE USE COST: PURCHASE VS. NEW*



*Data on which these graphs are based are included in appendix B-29.

GRAPH 3

RELATIVE LIFE USE COST: LEASE VS. PURCHASE*



*Data on which this graph is based are included in appendix B-29.

building and of lease as a percent of purchase all increase. The variations in the characteristics of increase were more surprising. In one case the total building cost of leasing becomes more expensive than a new school after 10 years (the Block School); in other cases after about 19 years (P.S. 232) and 23 years (Newtown H.S. Annex); and unexpectedly, in other cases (Burnside Manor, P.S. 211, and T.Jefferson H.S. Annex) leasing appears to remain considerably less expensive than purchase beyond 25 years.[1] The patterns for purchased buildings were also erratic, in no case exceeding the cost of new school buildings within the limits of the projections.

While it must be noted that the seven cases constitute a very small and not very representative sample (given, for example, that all the cases are located in New York City), they suggest that variation may be the rule; so unless and until more definitive cost analyses are reported, separate consideration of each case is advisable.

In many instances, perhaps in most, the annual unit values will be a more significant factor for decisions than the total building cost. The annual unit values are a more direct measure of the relative economic costs inherent in alternative buildings. As summarized by table 10, the projections suggest that even though annual unit value for found space school buildings as compared to new school buildings varies

[1]The projections stopped at 20, 25, or 30 years, according to the maximum projected life use of the particular found building. Projecting costs beyond the limits of probable usefulness of the building would not have been meaningful.

TABLE 10

ANNUAL COSTS PER PUPIL AND PER SQUARE FOOT OF FOUND SPACE SCHOOLS (AS PERCENT OF NEW SCHOOL BUILDINGS)

School	Found Space Value as % of New: Value Per Pupil	Found Space Value as % of New: Value Per Square Foot
Leased Buildings		
JHS 57	21%	26%
Harrington Annex (Church)	(58)	(NA)
PS 26	86	76
IS 252	81	83
Lowell HS	62	97
PS 219	105	113
PS 211	95	113
T Jefferson HS	131	131
Wm Taft HS	100	131
James Monroe HS	62	148
PS 232	184	198
Block School	185	211
Mean	93	121
Standard Deviation	49	53
Purchased Buildings		
PS 85	55	55
Olney HS	59	63
PAS-ILC	148	78
Newtown HS	62	85
I ennis Haley	73	86
eonridge JHS	41	88
arrington (Coal Building)	55	89
Bartram Commercial	50	93
J.L. Barron	53	115
Hernandez Bilingual	86	135
S Boston HS	85	136
Mean	70	93
Standard Deviation	30	26

considerably, purchased found buildings tend to be the most economic school facility alternative. The average annual pupil value (70 percent of new school buildings with a standard deviation of 30) was raised *considerably by one* building - the Fifth and Luzerne Street Building, with an annual pupil value of 148 percent of the comparative new school building. In the other 10 cases the pupil value was less than in a new school building, ranging from 41 to 86 percent (averaging 62 percent for the 10 cases, with a standard deviation of 15). The average total value per square foot, 93 percent of new, showed greater variations with a range of 55 to 136 percent of new. In eight of 11 cases the annual square foot value of purchased buildings was also less than new school buildings.

The average annual value per pupil for leased buildings (12 samples) was 98 percent of the value for new school buildings, virtually the same. The standard deviation on this mean, however, was 49, suggesting great variation in the relative values of leased buildings. The annual pupil values for the 12 leased buildings examined ranged from 21 to 185 percent of respective new school buildings, in 7 cases less expensive than a new school building and in five cases more expensive. The relative annual square foot values averaged 121 percent of new buildings and, with a standard deviation of 53, also showed wide variations in comparative cost. Leased buildings were cheaper per square foot in only four of the 11 cases (and in one instance the cost ratio was not available).

Further, the cost values for 11 of the 12 leased buildings were projected under purchase arrangements and the costs

TABLE 11

COMPARISON OF PROJECTED ANNUAL PER PUPIL AND PER SQUARE FOOT COST VALUES FOR FOUND SPACE SCHOOLS UNDER LEASE AND PURCHASE ACQUISITION ARRANGEMENTS (AS PERCENT OF NEW SCHOOL BUILDING COSTS)

Value Per Pupil			Value Per Square Foot		
	% of New			% of New	
School	Leased	Purchased	School	Leased	Purchased
Leased Buildings					
JHS 57	21	21	JHS 57	26	26
Lowell HS	62	59	PS 26*	76	82
James Monroe HS	62	29	IS 252	83	64
IS 252	81	62	Lowell HS	97	92
PS 26*	86	93	PS 219	113	82
PS 211*	95	112	PS 211*	113	133
Wm Taft HS	100	90	T Jefferson HS	131	109
PS 219	105	76	Wm Taft HS	131	117
T Jefferson HS	131	109	James Monroe HS	148	70
PS 232	184	136	PS 232	198	146
Block School	185	58	Block School	211	66
Purchased Building					
Newtown HS	97	62	Newtown HS	133	85
Mean:	101	76		122	89
Standard Deviation:	48	34		51	33

*Indicates that purchase is more costly than lease.

of one purchased building were figured under a lease arrangement. As is evident from table 11, the annual unit values, both per pupil and per square foot, were more favorable for the purchased building alternative in 10 of the 12 cases.

That the annual pupil values as compared to new school buildings tend to be less than the annual values per square foot reflects the fact that the found space schools examined have a smaller area per pupil than typical school buildings, a reflection in turn of the frequent absence of specialized facilities in found space schools. In fact, of the 23 found space schools examined here, in only four was the area per pupil ratio higher than in the new school building.

This highlights an important point worth repeating: cost is only one factor in facility planning decisions; equally important is what the cost includes.

The data on annual unit values were examined for other cost patterns or relationships. Aside from reinforcing the conclusion that each case must be treated separately, few hints of patterns were discovered. There appears, for example, to be no relationship between the length of the lease and unit values.

More surprising, there appears to be no definitive relationship between the extensiveness of renovations and the relative annual unit values of found space projects, at least based on cost data currently available.[1] That more extensive

[1] It is conceivable that actual long-term future operations and maintenance costs, which in this analysis were mostly projected, will reveal more definitive relationships.

TABLE 12

COST TRENDS BY BUILDING TYPE
ORDERED BY PERCENT (of New School Building Cost)

Per Pupil			Per Square Foot		
Building Type	Mean	St.Dev.	Building Type	Mean	St.Dev.
Lease					
Factories & Industrial (2)	79	23	Caterers(2)	104	39
Caterers(2)	93	10	Factories(2)	105	11
Synagogues & Churches (4)	97	60	Supermarkets(3)	112	13
Supermarkets(3)	118	18	Synagogues & Churches (4)	136	57
Bowling Alleys (2)	141	62	Bowling Alleys (2)	165	46
Purchase					
Synagogues & Churches (3)	50	18	Synagogues & Churches (3)	67	3
Miscellaneous(2)	53	45	Miscellaneous(2)	81	78
Offices(2)	54	1	Caterers & Clubs (3)	85	31
Supermarkets(3)	78	30	Supermarkets(3)	95	14
Caterers & Clubs (3)	79	21	Factories & Industrials (7)	97	27
Bowling Alleys (3)	90	40	Offices(2)	102	18
Factories & Industrial (7)	94	45	Bowling Alleys (3)	106	35

renovations do not necessarily result in greater annual unit values is illustrated by graph 4.

The data were also examined to determine if any relationship was apparent between annual values and different building types. These data, tabulated in table 12, suggest that conversion of bowling alleys may be more expensive than other building types, but even this conclusion is highly tentative Even though there were few samples in most building type categories, the variations tended to be very large. This fact once again argues for separate cost analyses.

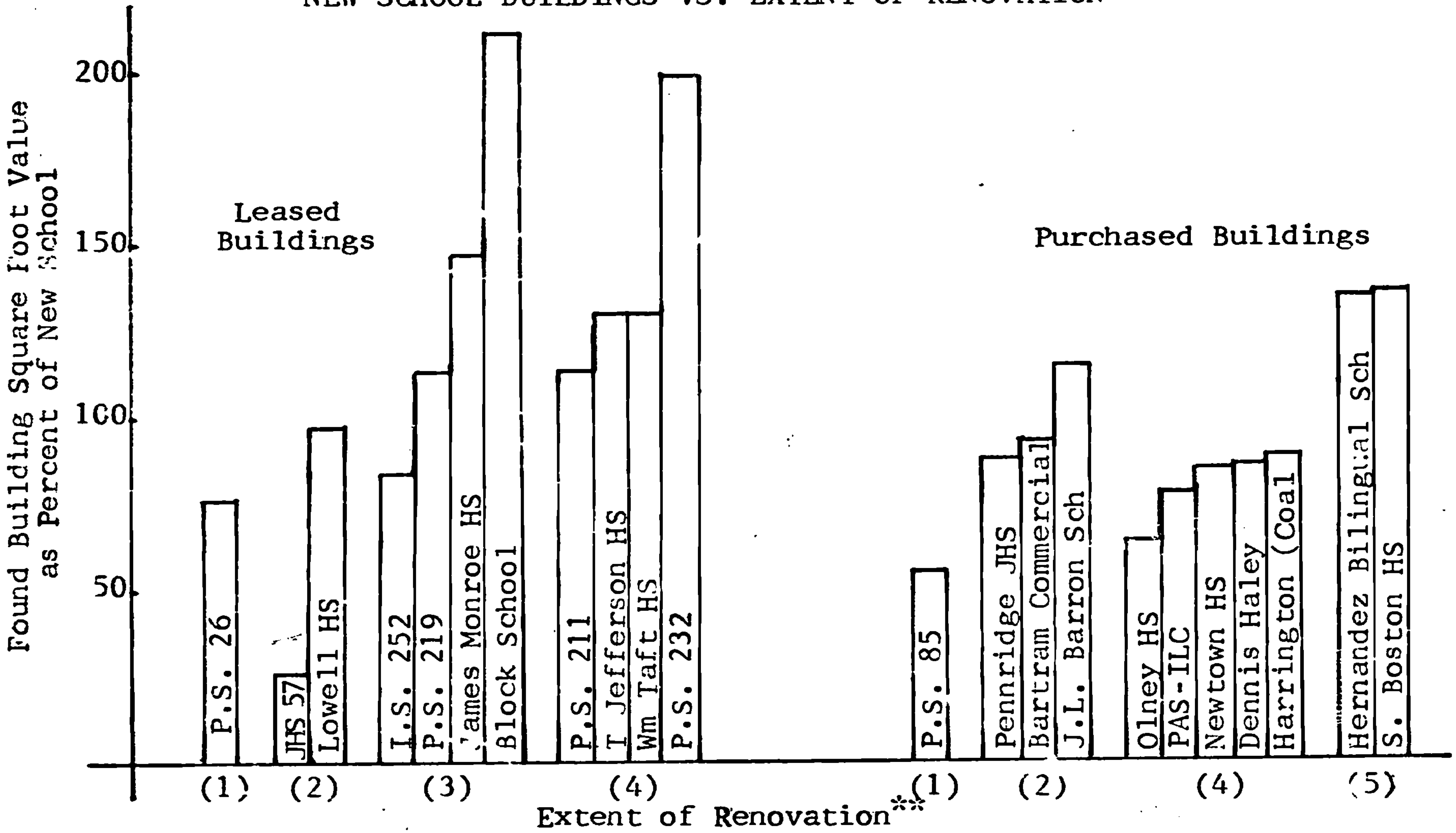
It appears from table 13 that there is no significant difference in cost solely attributable to open space versus self-contained classroom type found space conversions.

On all of these matters the result appears to depend more on how the whole package is put together than on any one single factor.

It is not surprising, however, that securing a building free usually results in less expense. The Sumner Avenue Armory, converted to JHS 57 Annex, and the Frankford Arsenal Gauge building in Philadelphia, converted to the Olney H.S. Annex, were both donated by the federal government. A glance at table 10 reveals that the annual unit values of these two buildings are, respectively, the least expensive and among the least expensive, as compared to new school buildings, of any examined in this study. It should be remembered, however, as noted in chapter VI, that the Philadelphia Board of Education rejected the gift from the federal government of another building because it would cost too much to convert.

GRAPH 4

VALUES PER SQUARE FOOT OF FOUND SPACE SCHOOLS AS PERCENT OF NEW SCHOOL BUILDINGS VS. EXTENT OF RENOVATION*



*Data on which this graph is based are included in table 10.

**The meaning of the numbers, rating the extent of renovation, is: (1) Cleaning and cosmetic patching; (3) Systems upgrading, minor structural changes, and non-structural modifications; (5) Complete gutting and new systems; and (2) and (4) are in between.

TABLE 13

RELATIVE ANNUAL COST VALUES OF OPEN SPACE VS. SELF-CONTAINED CLASSROOM TYPE FOUND SPACE SCHOOL FACILITIES

(As Percent Of New School Building Costs)

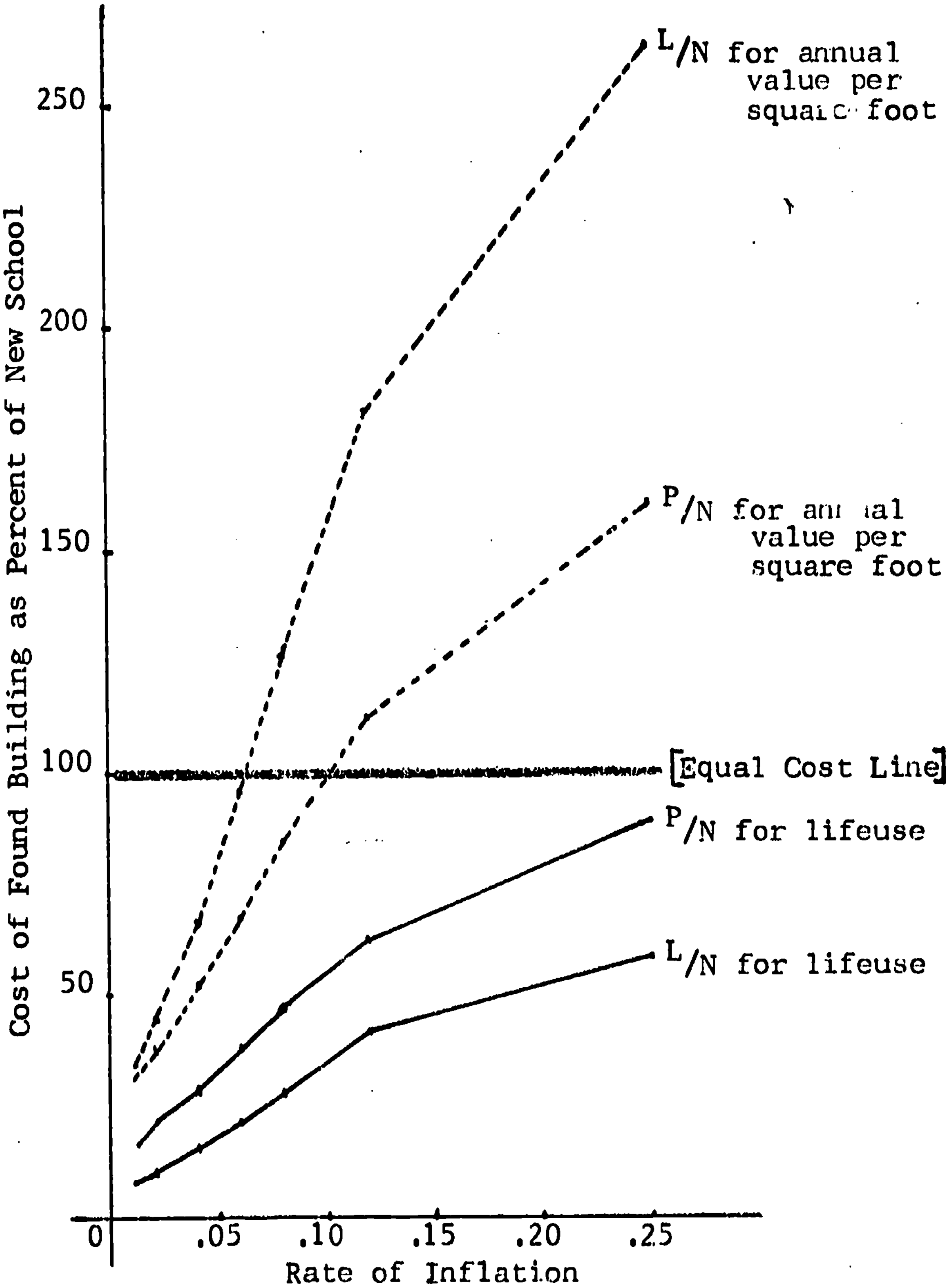
Space Type/School	Value per Pupil		Value per Square Ft	
Classrooms	Lease	Purchase	Lease	Purchase
James Monroe H.S.	62%	29%	148%	70%
I.S. 252	81	62	83	64
Wm. Taft H.S.	100	90	131	117
P.S. 219	105	76	113	82
P.S. 232	184	136	198	146
Newtown H.S.	97	62	133	85
Harrington (Coal Bldg)	...	55	...	89
Olney H.S.	...	59	...	63
S. Boston H.S.	...	85	...	136
Hernandez Bilingual	...	86	...	135
Mean	105	74	134	99
Standard Deviation	42	28	38	32
Open Space				
Lowell H.S.	62	59	97	92
P.S. 26	86	93	76	82
P.S. 211	95	112	113	133
Block School	185	58	211	66
Pennridge J.H.S.	...	41	...	88
Bartram Comm. H.S.	...	50	...	93
J.L. Barron	...	53	...	115
P.S. 85	...	55	...	55
Dennis Haley	...	73	...	86
PAS-ILC	...	148	...	78
Mean	107	75	124	89
Standard Deviation	54	36	60	22
Other/Miscellaneous				
J.H.S. 57/Sumner	21	21	26	26
Harrington (Church)	58	...	(NA)	...
T. Jefferson H.S.	131	109	131	109
Lowell H.S. (All Bldg)	...	153	...	97

On the other hand, the Philadelphia Board of Education has found the economics of renting church property very favorable. Church owners tend to be cooperative, willing to give one-year leases for use five days a week, which is convenient to the Board of Education when long-term enrollment needs are unclear. Furniture storage, utilities, and a full-time janitor are customarily negotiated as part of the lease. Furthermore, churches are located in areas zoned for classroom use, so securing a certificate of occupancy presents no problem. All considered, as far as the Board of Education is concerned (and presumably the church owners as well), it is a simple, convenient, and economical arrangement.

Inflation rates are an important factor in the relative costs of school facilities, particularly for long-term needs. If all other factors remain fixed higher future inflation rates will increase the value of current investments. Rate of inflation in this context essentially operates as a surrogate for replacement cost; that is, how much it will cost to acquire a facility at some future time to replace a current one. The relevance of this relationship to school facilities financing is illustrated by graph 5, which depicts the relative cost of an alternative building to a new school building under changing rates of inflation, in the case of the Newtown H.S. Annex. It shows that for lower projected inflation rates purchase and leasing of existing buildings will be relatively more advantageous with respect to cost than a new school building, and vice versa. Under conditions of higher inflation rates the cost advantage of those alternatives with

GRAPH 5

RELATIVE COST OF LEASED AND PURCHASED BUILDINGS TO NEW SCHOOL, WITH CHANGING RATE OF INFLATION, IN THE CASE OF NEWTOWN H.S. ANNEX*



*Data on which this graph is based are included in appendix B-30.

longer life uses increases. In the case of the Newtown H.S. Annex, the life expectancy of a new school building (45 years) is considerably greater than either of the alternatives (lease 10 years and purchase 25 years).

This example provides a good reminder of the simultaneous danger and advantage of the computer program for simulating school facility costs. The sensitivity of the model to small variations in input data items means that great care must be exercised in the selection of and assumptions about data values. Otherwise outcomes may be skewed. For this reason, on the positive side, with this cost simulation model it is easy to change one variable at a time, as in the above example, in order to determine cost sensitivity and/or cutoff points - that is, the input cost or value limit above which one alternative becomes more favorable than another. In the case of the Newtown H.S. Annex, for example, from graph 5 it can be concluded that for rates of inflation of ten percent or higher, with respect to annual square foot values, a new school building will be cheaper than a purchased building, or for that matter, a leased building.

In summary, the most definitive cost conclusion of this study is that in each case school facility alternatives should be separately examined and assessed. In any project there can be high variations in final costs as a result of personal negotiation, settlement terms, or the like. Thus a given package should be assessed in its entirety. This conclusion might seem reasonable and unstartling on the surface, yet there are many who hold definite beliefs or expectations as to

conditions or circumstances under which found space is cheaper than a new school building. One frequently quoted guideline, for example, states: If renovation costs amount to more than 50 percent of the cost of new construction don't convert. No documented or analytic support was discovered during the course of this research to support this thumbrule. Those patterns and conclusions which were noted tend to conform to conventional financing wisdom - e.g., regarding lease for short-term needs and the impact of inflation rates. On the basis of the samples it appears that purchase, on the average, is the cheapest of the alternatives; but with such a limited number of samples this must be taken for the present as an hypothesis rather than a conclusion.

Perhaps with more experience on which to base analysis the variety apparent in this study may eventually reveal some clear patterns. The relationship of initial acquisition costs to lifetime costs and the relative impact of state aid, property tax losses, and O and M costs on different facility alternatives are other questions which a more elaborate cost study might also explore. A cursory examination of the data of this study, for example, revealed that the O and M cost component comprised approximately two-thirds the total lifetime cost of new school buildings.[1] If anything near this ratio were upheld by subsequent studies - especially ones which have greater access to actual O and M cost figures - the implications for policy and design on new building construction

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[1]For 23 hypothetical new school buildings, with an

would be enormous. Clearly not enough research has been done on this very important area of school facilities cost.

Cost, however, is not the only factor on which school facility decisions should be based. The interaction of cost with educational, environmental, sociopolitical, and other factors and a decision framework for putting all these together comprise the subjects of the next chapter.

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expected life of 45 years, the mean percentage of O and M cost to total lifetime cost was 62.5, with a standard deviation of 8.9.

CHAPTER IX

TRADEOFFS AND EVALUATION OF ALTERNATIVES IN PLANNING

This report has stressed the importance of exploring school facility opportunities and alternatives systematically, comprehensively, and carefully. Toward this end and under the general heading of planning, suggestions, experiences, and analyses of found space cases have been presented. Planning has referred in this context simultaneously to a systematic method, a series of components pertinent to a particular task, and an abstract notion of carefulness; even when it meets those specifications, however, planning offers no panacea or guarantee of totally successful outcomes in every aspect of a school facility alternative. It has been evident, for instance, from some of the examples cited that human shortsightedness frequently interferes with well laid plans.

Despite its vulnerability and shortcomings, planning can serve to clarify alternatives and consequences and to rationalize possible choices. Choices, or tradeoffs, must be an integral part of any responsible decision.

Up to this point the various components of school facilities have been discussed mostly in isolation from one another; for example, patterns in acquisition time for found space conversion were discussed in relation to new school buildings but independent of cost or the compatability of the physical environment to the educational program. The relative

advantage of a single component, however, is not likely to be sufficient to dictate a decision between alternatives. This chapter therefore examines the nature of tradeoffs and offers a method for their evaluation in decisions on school facilities.

Tradeoffs

From the material in chapter V it is apparent that acquisition time for found space facilities is consistently less than for new school buildings. Later, in chapter VIII, it was noted that the life usefulness of new school buildings tends to be greater than converted ones and that the square footage per pupil in found buildings tends to be less than in new school buildings. The latter fact essentially reflects the more intense utilization and/or the absence of certain special facilities in many found space conversions - e.g., gymnasiums, cafeterias, auditoriums. The most consistent shortcoming of found space buildings studies was the lack of physical education facilities. Of the schools visited, 10 had no indoor physical education space, 6 had no available outdoor play space, and another 6 had neither. Only 9 schools had both indoor and outdoor physical education provisions and many of these were limited or otherwise inadequate.[1]

Aside from these patterns, most of the important characteristics of school facilities are not generalizable for the different categories of buildings. The merits of alternative buildings should be assessed separately; yet in the final

[1] In 7 cases the question of physical education facilities was not applicable.

analysis any school facility will include a mixture of relative advantages and disadvantages. Another glance at some of the found space cases previously discussed will help illustrate this point.

The Sumner Avenue Armory, now an annex to JHS 57, combines low cost with a dismal physical environment. The annual pupil and square foot values, only 21 and 26 percent of a new school building respectively, reflect the fact that the building was acquired at no cost. The dismal educational setting is related to the manner in which renovations attempted to cope with code requirements. Perhaps a greater expenditure on renovations would have made a difference. Regarding the outcome, however, the decision to trade off environmental quality for cost is apparent.

The Philadelphia Board of Education likes to lease church property for one-year periods, finding such arrangements convenient and economically favorable. The tradeoffs in such cases can be several as, for instance, at the Harrington Annex. The annual pupil value of the Harrington elementary school annex, located in a church basement, is only 58 percent of a new school building. The annex itself consists of four much larger than average classrooms. Since they are located below grade, however, little natural light filters through the few basement windows. Acoustics are mediocre, the heating is sufficient but uneven, and the luxury of large rooms is tempered by inconveniently placed columns. Certain specialized activities like art, audio-visual and library use, and assemblies require unpleasant class treks to the main building

three long blocks away. Oddly, in spite of the environmental problems, teachers love the informality, isolation, lack of pressure, and independence from the main building, claiming that the students are happier; but they are concerned about the uncertainty of the use of the building in the future.

Although not the case at this Harrington Annex, many church property leases require storage of all school materials over weekends when the spaces are used by congregation members.[1] Such arrangements are clearly an inhibition to freedom in any school program.

At the Block School in Brooklyn, an unusually creative and exciting place for educating children which came about at an unusually high cost, leasing was also a compromising factor. The annual per pupil and per square foot values of the Block School were the highest of any analyzed in this study - both in absolute amount (at $801 per pupil pupil per year and $10.36 per square foot) and relative to a new school building (185 percent of the new building value per pupil per year, 211 percent of the square foot value). The lease was negotiated for three years - in view of project funding which was assured for only that long - and what otherwise would have been a reasonable renovation cost had to be amortized over this short period. Had the building been purchased instead (which, in fact, is now being considered by the NYCBE) the costs would have been considerably less than a new building.

This conversion has other shortcomings. Although the

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[1]Such provisions were characteristic of church property

physical environment is an exceptionally stimulating one, taken as a whole, it is nevertheless marked by certain annoying troubles, compounded by disputes between the landlord and the tenant. The building opened with broken and inoperable windows - some of which have been permanently screwed shut - and a defective flue in the heating system. A simple malfunction in the air conditioning system, thought to be complicated, became a matter of a long, protracted dispute between the landlord and the tenant before it was finally corrected.

These examples are useful reminders of tradeoffs inherent in leasing property, as opposed to purchase. Leasing offers the advantages of short-term space commitment, and less responsibility for upkeep and maintenance. The disadvantages are loss of independence and control, and a dependence on the good faith of the landlord to uphold his end of the bargain. Especially with schools, given a context of extensive school building vandalism, recent experiences tend to suggest that in the area of major maintenance the question of landlord versus tenant responsibility can be very fuzzy.

The size and scope of a project can also influence the nature and the complexity of the planning. The planning and conversion, for example, of the relatively small, 15,000-square-foot girdle factory in Perkasie, Pennsylvania to an annex for the Pennridge junior and senior high schools was relatively simple, fast, and yet unhurried, with the largest portion of the renovations performed by school staff. In

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rentals by the Westchester BOCES #1.

this case the question of tradeoffs was easy. This project was one of those fortunate cases in which everything falls nicely into place and planning helps capitalize on the inherent opportunities. The girdle factory, located immediately adjacent to the central school site, went bankrupt at a time when school enrollment projections indicated a clear and steady increase for this rapidly growing rural area. New school buildings were planned but would not be ready for several years. The factory building neatly filled the gap and also provided an opportunity to experiment with new programs: open space education and a new business education program. Staff were included in the planning and from the outset made preparations (including controlled testing) to compare and evaluate the performance of students in the somewhat experimental annex with those in the main school building.

The conversion of the Fifth and Luzerne building in Philadelphia - the PAS/ILC - provides an interesting contrast to the Pennridge Annex experience and is an odd example of tradeoffs, incorporating as it does extremes of success and failure, creativity and trouble. Problems were incurred nearly every step of the way in the Philadelphia case. The six-story, 217,000-square-foot industrial building has been the temporary and permanent home for a series of experimental educational programs - taken as a whole, a kind of comprehensive educational laboratory. Beginning in 1967, during the most lively and innovative period in the recent history of public education in Philadelphia, the controversal administration of school Superintendent Mark Shedd, this building became a focus

of attention and controversy. Although in disrepair, the building suddenly offered abundant space in densely settled Philadelphia at a time when school facilities were desperately needed in that city. Consequently, over the years a considerable amount of time, energy, enthusiasm and planning went into the physical plant and all the programs that have occupied it. While the building has proved fairly flexible both educationally and demographically, it has been a source of continuing trouble structurally, environmentally, and economically. The problem can be traced to lack of a long-range plan, complicated by the size and scope of the building; such questions as who would occupy the building when, for what purpose, and for how long, were never fully considered. As needs arose and programs were designed, areas of the building were converted. Renovations have been extensive and have become still more extensive due to the piecemeal approach. Strict reinterpretations of code requirements subsequent to renovations (which ruled, for example, contrary to prior understandings, that a new sprinkler system and sealed fenestration were inadequate) and systems failures in unrenovated areas (such as the bursting of a roof water storage tank) have resulted in expensive modifications and repairs to already completed work. Consequently, during the first six years, the building and the programs within it have been characterized by crises, flux, frustration, and insufficient coordination and planning. In contrast to the relative ease of the Pennridge Annex example, at the Fifth and Luzerne building the tradeoffs or compromises increased due to the inability of the planning

function to cope with the magnitude of the task.

Somehow, in spite of the chaotic planning. the Fifth and Luzerne project has still managed o be successful in many other ways. The building has been the locus of incomparable excitement, talent, and creativity which has been directed toward innovative educational programs and at times toward the physical environment. Unfortunately, all these factors don't yet fit together coherently; but despite its problems the building and its programs are among the educational showcases of Philadelphia.

In the final analysis any decision entails compromise. And in this respect found space conversion is inherently neither better nor .orse than new school construction or any other educational facility alternative. The best alternative will depend on needs, priorities, subjective sensibilities, what's available, and implementation. A major objective of systematic planning and decision making is explicitly to clarify assumptions, values, facts, and rationale on which choices are based. Without the explicit statement of such factors intelligent advice, fact gathering, and broad-based participation on decisions will lack a mutual focus. The alternative plan evaluation matrix (APEM), the subject of the next section, is a tool for providing that focus. It helps evaluate alternatives by forcing explicit judgments of the influencing factors.

Alternative Plan Evaluation Matrix

The alternative plan evaluation matrix (APEM) is a framework for selecting one alternative from among several. Its use is recommended for decisions when it is difficult to assess the net value of the disadvantages and advantages of different facility alternatives. Alternatives which do not satisfy a basic minimum condition can of course be disqualified from consideration. APEM offers a means for pulling together the various factors discussed in this study, coupling them with other criteria pertinent to a local school and clarifying their relative importance toward arriving at a decision.

Based on the planning-balance sheet, the goals achievement matrix, and other planning models for selecting one plan from several alternatives,[1] APEM is a tool for assigning weighted values to criteria which influence a decision but are not measurable in common units. Thus, for example, costs can be defined in dollars but adequacy for a given educational program cannot.

The various criteria, or objectives, which a school facility should fulfill, are listed on one side of the matrix,

[1] See, for example; Morris Hill, "A Goals-Achievement Matrix in Evaluating Alternative Plans," Journal of the American Institute of Planners, Vol. 34, No.2, 1968; Nathaniel Litchfield, "Evaluation Methodology of Urban and Regional Plans: A Review," Regional Studies, Vol. 4, pp. 151-165, 1970; Henry L. Michael and Sigurd Grava, "The Planning-Balance Sheet and the Barrio," Worldwide P. and I. Planning; and James

as illustrated in table 14. In this example the criteria are determined to be:

- Capacity: the size of the building with respect to enrollment or program needs.
- Time availability: how soon the building can be readied for occupancy, again with respect to needs.
- Need duration: the concordance of the building life use (as determined by the term of the lease, limitations imposed by state regulations, or assessments of the building condition) with the duration of the enrollment or program need.
- Educational program suitability: the adequacy of the building, under the proposed renovation conditions, for the desired educational program.
- Environmental adequacy: the adequacy of the building environmental characteristics under the proposed renovation conditions.
- Location: the adequacy of the location with respect to its surroundings, access, student population and other factors.
- Social/Political Acceptance: this category refers to a variety of diverse considerations such as local attitudes toward community institutions, or the likelihood, given local conditions and concerns, of getting a bond issue passed.

Meier, "Economic Development for an Indian Village," unpublished, Fall, 1968.

TABLE 14

ALTERNATIVE PLAN EVALUATION MATRIX

		Alternative									
		Found Space 1A		Found Space 1B		Found Space 2A		Found Space 2B		New School	
Criteria	Weighted Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value
Capacity											
Time Availability											
Need Duration (i.e., use lifetime)											
Educational Program Suitability											
Environmental Adequacy											
Location											
Social/Political Acceptance											
Cost: A. Long term											
B. Annual unit value											
Financing: Responsibility vs. control											
TOTAL											

- Cost: Long-term, or relative total building cost; and relative annual unit values.
- Financing: assuming lease versus purchase the relative value or preference regarding responsibility and control.

Prior to the evaluation of each of these criteria for the various project alternatives, the decision maker(s) applies weighted values, up to a value of 10, to each of the criteria, thereby judging its importance to the school district relative to the other objectives. For example, if space is needed immediately at virtually any cost to handle increased enrollments, then "capacity" and "time availability" would be ranked higher than other factors.

The various alternative options are then listed across the top of the matrix. A single found building leased "as is" or purchased and renovated by the school district would present two options, designated on table 14 as Found Space 1A and Found Space 1B. Found Space 2A and 2B represent a different building.

Each facility alternative is then ranked for each of the criteria. Then, for each criteria the weighted value is multiplied by the corresponding, designated rank for each building alternative. The summation of the new values for each building will suggest the preferred alternative - the one with the highest sum.

Objectives peculiar to individual school districts can be added to the matrix without jeopardizing the result. Since the criteria are pre-weighted in this analysis, decision

makers are faced with results in terms of prior weighted preferences. Although these weighted indices of objective achievement will lead to the selection of a single alternative, the outcome is nonetheless heavily dependent on the validity of the weighting scales and judgments employed. Some of the criteria, such as "social/political acceptance," are by nature subjective and not susceptible to measurement. Others, like cost, can be estimated with a fair amount of precision using the simulation model described above. Because of the subjective mixture of the weights and ranks, outcomes cannot be assumed to be logically, or mathematically, valid. Thus, the ultimate value of the APEM is that it forces explicit clarification in decision making. The greatest value comes from undertaking the process itself, which may be described as consciousness-raising with respect to a school facility decision.

SUMMARY AND RECOMMENDATIONS FOR FURTHER STUDY

The conversion of found space for educational use can be a great opportunity for a school district. In various ways it offers a potential means for reevaluating existing programs, revitalizing neighborhoods, and creating new educational and environmental forms. It can be a means for simplifying or avoiding completely problems related to new school buildings such as high cost or difficult financing, site acquisition and relocation difficulties, or pressures of time. Although none of these benefits is an absolute certainty, the essential point is that found space conversion can be a viable facility alternative to new school buildings for permanent, ongoing educational programs. As a generic form, however, it is neither inherently better nor inferior to new school buildings. For with found space, as with any school facility, local alternatives and circumstances must be examined on their own merits and in this process, care, attention, and common sense are important at every stage and level of planning.

To someone coming fresh upon the subject of found space it may well appear in this regard that the obvious and commonsensible has been rediscovered here, which may well be an accurate perception. Many of the conclusions of this study, taken individually, will seem neither new nor surprising to those familiar with educational facilities planning problems. At this point some perspective is needed. It was initially

expected that discrete patterns and conclusions would prevail of the sort proving that found space is cheaper and faster to acquire than a new school building and that certain building types or characteristics would generally prove suitable or unsuitable for certain purposes. Indeed, one might envision a matrix which would catalogue the matches and a "how to do it" handbook. While certain of the initial expectations have been substantiated - like reduced acquisition time - regarding most issues there has been considerable variation. The search for simple generalizations, as viewed in retrospect, turned out to be infeasible; for the planning and realization of any school facility is a complex undertaking.

Found space, for example, can be more or less expensive than a new school building, depending on specific circumstances and on the particular definition or perspective of cost. Found space is nearly always cheaper than a new school building for short-term needs, based on total dollar outlay; but for long-term needs, based on pupil or square foot cost comparisons, outcomes vary considerably. Therefore, specific cost projections should be undertaken. Toward this end the cost simulation model devised for this study may be used.

The expectation that existing physical constraints, by definition more prominent in found spaces than in new school buildings, would influence reconsiderations of the educational program and the plan for the physical environment and lead to increased adaption and creativity was to an extent supported by the cases examined during this study. But creative

physical and educational program adaption, while apparently more common in found space schools than in new school buildings, is neither inherent in the process nor essential for a satisfactory result in the conversion of found buildings - any more than it is for the planning and construction of a new school building.

Found space can be converted for traditional or innovative educational program purposes, although psychologically it is often more acceptable for the latter. Furthermore, neither age, building type, nor building condition singly is a sufficient criterion for either matching program needs or deciding on a specific building.

All of these outcomes depend on a myriad of factors which can best be dealt with by careful planning. The chapters that comprise the body of this report offer insights and experiences which can broaden understandings of potential consequences and enlighted decisions. Nonetheless each instance must be considered separately on the basis of local needs, constraints, alternatives, and opportunities. In this connection, particularly in assessing the merits of buildings, close cooperation with and attention by professionals is advisable.

Indeed, the whole planning process really entails a combination of technical and analytic expertise - which may be provided by outside professionals - and local user determinations of needs and objectives. The ability throughout this process to maintain clear and open communication on desires, intentions, and constraints can often be the most important

factor for the long-range succ of a project.

Thorough and coherent planning, an important factor in the development and acquisition of any school facility, is especially important in the conversion of found space because of the potential problems and constraints inherent in existing buildings. Ironically, planning has been lacking in the conversion of many buildings - perhaps due to inexperience in the use of found buildings or because found buildings have been used merely to tide over during an emergency or because they are viewed as temporary facilities. Such reasons notwithstanding, a haphazard or makeshift approach to found space conversion is not generally justified, as it is not justified in construction of new school buildings.

These issues regarding planning of educational facilities at the local level are equally pertinent at other levels of policy and decisionmaking - as at the state government level - where the uses and potentials of the found space alternative have also often been ill-considered. Many of the negative as well as positive aspects of local found space conversions are reflections of policies and procedures at higher levels. In New York State particularly found space conversion has been viewed as little more than a temporary and/or emergency solution to school space needs. And even though the New York State Laws and policies pertinent to found space conversion have changed in the past few years in the direction of enabling broader use of this alternative, the new laws are terribly confused and, in spite of their apparent intentions, are inhibiting public school use of existing buildings.

Regarding school buildings, therefore, New York State as a first priority must make its own study of the facts and issues with the purpose of formulating an unambiguous set of laws and policies. Otherwise state leadership and influence on such issues will be undermined. The policies of other states, such as Pennsylvania and Massachusetts, which in recent years have also moved toward facilitating school use of found space by enacting new state building aid provisions, may serve as useful models for New York State.

Further, the research undertaken herein reinforces the need for additional study of certain areas. More comprehensive studies on a variety of topics would improve future facility practices: for instance, the relationship of initial acquisition costs, operation and maintenance costs, and other facility cost components to building lifetime costs; the effects of user involvement in the planning and satisfactions with school facilities; and reconsiderations of manuals and codes with particular attention to recycling buildings.

This report has stressed the value of planning within a broad framework of issue considerations. With the benefit of hindsight and in the context of the present national pattern of declining student enrollments and closed school buildings blighting their environments it is easy to dismiss found space conversion as an opportunity that was missed during the school building boom of the 1960s. Even though the combined enrollment and building obsolescence projections for New York State indicate that new school space will be required on a continuing basis the great school space pressure has been

lifted for the present. Taking a cue from the past and through research such as that described above, the present respite offers educators and school facility planners an unusual opportunity to undertake more deliberate and careful planning for the future.

APPENDIX A

FORMS AND CHECKLISTS FOR OBSERVATIONS AND DATA GATHERING

Costs and Finances Checklist

School____________________ Building Type____________
Location____________________ Age of Building____________
Source of Information____________ No. of Stories____________
No. Pupils____________

If purchase:

Site: $________
Acres________
Building: $________
Sq. ft.________
Cu. ft.________

Bond Issue: $________ @______% Interest
No. Yrs.________
Ann. D.S. $________ $_____Interest/yr.
$_____Amort./yr.

If lease:

$/year ________
No. Yrs. ________
Sq. Ft. ________
Cu. Ft. ________

Renovation Costs:

Contract date____________
Date of Construction completion____________
Rated Capacity (in pupils)____________

Gross Area __________ sq. ft.
Net usable Area__________ sq. ft.

	$	Sq. Ft./ Units	$/per Sq.'/units
Mechanical:			
HVAC			
Plumbing			
Electrical			
General Contract (GC)			
Sub-Total			
Incidentals:			
Site Development			
Fees: Arch./Eng.			
Legal			
Insurance			
General Administ.			
Clerk of the Works			
Utilities and Services			
Materials and furnishings			
Other Furniture and Equipments			
Other (____________)			
TOTAL:			

Renovation is/is not included in lease/purchase costs.

(Costs and Finances Checklist - 2)

Operations and Maintenance Costs

Operations:	$/year	No. units	$/unit
Electricity			
Oil			
Gas			
Water			
Other(__________)			
Insurance			
Custodial Staff			
No. Employees _____			
Total Salaries			
Supplies (List major ones):			
1.__________			
2.__________			
3.__________			
4.__________			
5.__________			
Other (__________)			
TOTAL COST of operation:			

Maintenance:	$/year	No. units	$/unit
Maintanence Schedule (Regular Items)			
1.__________			
2.__________			
3.__________			
4.__________			
5.__________			
Total Costs:			

Major Repairs (list)	Date	$
1.__________		
2.__________		
3.__________		
4.__________		
5.__________		

TOTAL (Operation and Maintenence)

Vandalism and Theft

	Date	Units	$	Insured (\$)
1.__________				
2.__________				
3.__________				
4.__________				
5.__________				

(Costs and Finances checklist - 3)

Land Values and Costs in area

Location: ____________________
Date: ____________________
Source of Info ____________________

Sample Land Values: $/Acre Location Date of Sale

1. ____________________
2. ____________________
3. ____________________
4. ____________________
5. ____________________
6. ____________________

Sample Rental Values: $/Sq. Ft. Location Bldg. Type Sale Date

1. ____________________
2. ____________________
3. ____________________
4. ____________________
5. ____________________
6. ____________________

New School Constructions: Total $ Level No. Pupils Location Sq. Ft. Date
(local)

1. ____________________
2. ____________________
3. ____________________
4. ____________________
5. ____________________
6. ____________________

Environmental Checklist

School________________________
Location______________________
____
School Level__________________
No. of Stories________________

Found Building Type___________________
Building Age__________________________
Present Capacity Range________________
Date of Visit_________________________

Structure: Type:__________________
Fire Resistance Class:______
Materials________________
Other Comments:__________
____

No. of Stories: _________
Square Footage:__________
Cubic Footage:___________

Foundations: Footings______________
Walls__________________
Other Comments_________
____

Ceiling: Height (from floor)__________
Material:___________________
Finish/color:_______________
Properties:
Acoustic:_________________
Visual: (glare)___________
Other (eg. sprinkler, etc.)_
____
Other Comments:_____________
____

Floors: Material___________________
Finish/color__________________
Properties:
Acoustic:_____________________
Visual (Glare)________________
Maintenance Characteristics:____
____
Other Comments:_______________
____

Permanent Walls:

	Interior	Exterior
Height:	______	______
Material:	______	______
Finish:	______	______
Properties: (A & V)	______	______
	______	______
Use of:	______	______
	______	
Other Comments:	______	______
	______	______

Movable Partitions:
Dimensions:_________________
Material:___________________
Finish/color________________
Properties (A & V)__________
____
Requirements for moving:____
____
Other Comments:_____________
____

Roof: Material:__________________
Finish:___________________
Maintenance Requirements__
____
Use:______________________
Drainage:_________________
Other Comments____________
____

(Environmental Checklist - 2)

Doors:

	Interior	Perimeter
Number	________	________
Dimensions	________	________
Material	________	________
Finish/color	________	________
Properties	________	________
Hardware	________	________
Other Comments	________	________

Windows: Type ________
Dimensions ________
Material (Thickness, Quality, etc.) ________
Color (tint, transparence, etc.) ________
Locations ________
Other comments ________

Corridors:
Materials ________
Finishes ________
Width ________
Other dimensions ________
Other comments ________

Lighting:
Type of Fixtures: ________
Size of Fixtures: ________
Lumination intensity: ________
Lighting flexibility:
Movable fixtures ________
Reostats ________
Zone Controls ________
Voltage requirements ________
Other comments ________

Heating	Ventilation	Air Conditioning
Type of System ________	________	________
Zonal Control ________	________	________
Responsiveness ________	________	________
Fuel Requ. ________	________	________
Maint. Req. ________	________	________
Other Comments ________	________	________

Plumbing and sanitary systems:

Enumeration of Services:	Comments:
Toilets	
Boys ________	________
Girls ________	________
Staff and Other ________	________
Wash basins ________	________
Water fountains ________	________
Kitchen facilities ________	________
Disposal system ________	________
Other ________	________

(Environmental Checklist- 3)

Electrical Services:
- Enumeration of Outlets________
- Voltage Capacity________
- Heavy Electrical Equipment________
____
- Other (and Comments)________
____
____

Special Equipment:
- Intercom________
- Telephones________
- Master time________
- Clocks (No. and Locations)________
____
- Fir Detectors________
- Fire Alarm system________
____
- Other Alarm Systems________
____
- Other________
____
____

Audio-Visual Provisions:
____
____
____
____
____

Display and Chalk Boards:
- No. of Display________
- Location " "________
____
- Type________
- Material________
- No. of Chalk________
- Location "________
- Type________
- Other Comments________

Miscellaneous and Other Comments:
____
____
____
____
____
____
____
____

SCHOOL PLANT OBSERVATION FORM - School Overview

School: Date:

Address: Found Building Type:

School Level: Capacity Range:

Floor Plant Size:

Stories:

Walls - Exterior:

Interior:

Floors:

Ceilings:

Roof:

Entrances:

Corridors:

Doors- Perimeter:

Interior:

Fenestration:

Lighting:

Heating:

Ventilation:

Plumbing Services:

Site Characteristics:

Orientation:

Ancillary Spaces:

Special Characteristics:

Other:

*Note - Sketch on other side

SCHOOL PLANT OBSERVATION FORM - Interior Spaces

School: Date:

Size: Capacity Range:

Space Identification: ______________________________

Floor:

Permanent Walls:

Non-Permanent Partitions:

Furniture:

Ceiling:

Lighting (Natural and Artificial):

Acoustics:

Heating:

Ventilation:

Electrical Services:

Fenestration:

Orientation:

Plumbing Services:

Audio-Visual Provisions:

Display and Chalk Boards:

Other Equipment:

Door Details:

Fire Exit Distances:

Ancillary Spaces:

Other:

*Note - Sketch on other side

Educational Program Check List

School________________

No. of Students________ No. of Teachers________

Age Range______________ Grade Levels____to____ Non Graded____

Program Type:

Self-contained Classroom______ Team Teaching______

Open School______ Peer Teaching______

Cluster Grouping________ School w/o walls____

Interest area organization____ Other_____( )

After School Program:(If any, describe)

Special Facility or Equipment Programs:

Art____________

Music____________

Theater________

Shop____________

Typing__________

Other Vocational____( )

Other Vocational____( )

Science Labs________

Language Labs_______

Media Room__________

Other Resource Lab_____( )

Other Resource Lab_____( )

Other_______( )

Other_______( )

Storage: Facilities:

Needs:

Use of: Floors:

(describe) Ceilings:

Walls:

Physical Education Facilities

Indoor Gym____________

Outdoor Facilities_____

Locker Rooms__________

Auditorium______

Cafeteria_______

Library_________

Multipurpose spaces_____

Lounges:

Teachers__________

Parents__________

Students__________

Offices (List)__________

APPENDIX B

SUPPLEMENTARY TABLES

TABLE 15

ANNUAL (MEDIAN) SCHOOL CONSTRUCTION COSTS PER PUPIL IN NEW YORK STATE AND NEW YORK CITY IN DOLLARS (Exclusive of Site, Fees, and Incidentals)

		New York State*				New York City			
Year		Elem	Middle	H.S.	All	Elem	Middle	H.S.	All
1965	T**	...	...	...	...	...	...	2311	2311
1966	M	...	...	...	1712	...	...	...	...
	S	...	...	...	1693	...	...	...	...
	T	...	...	...	1700	...	...	...	...
1967	M	1561	2002	2289	1860	...	...	...	...
	S	1965	2123	2734	2029	...	...	...	...
	T	...	...	...	1931	4516	2454	2711	2485
1968	M	1679	1846	2768	1909	...	...	...	...
	S	1808	2017	2526	1992	...	...	...	...
	T	...	...	...	1960	3210	2861	2993	3000
1969	M	1776	2067	2345	2310	...	...	...	...
	S	1945	2636	2903	2364	...	...	...	...
	T	...	...	...	2346	3449	3825	4290	3876
1970	M	1945	3241	2526	2231	...	...	...	...
	S	2004	2475	3454	2266	...	...	...	...
	T	...	...	...	2248	(13,323)	4052	6963	5241
1971	M	2166	2944	2819	2620	...	...	...	...
	S	2682	3185	3184	2915	...	...	...	...
	T	...	...	...	2758	5154	4771	4637	4875
1972	M	2506	3101	2963	2656	...	...	...	...
	S	2426	3930	4649	3097	...	...	...	...
	T	...	...	...	2955	4941	4975	4194	5282
1973	M	2323	2642	2896	2662	...	...	...	...
	S	2447	3054	...	2877	...	...	...	...
	T	...	...	...	2748	4674	5296	...	5055

SOURCES: Division of Educational Facilities Planning NYSED, Semi-Annual School Cost Reports..., March 1966 to September 1973 inclusive, and Office of School Buildings, New York City Board of Education, "School Construction Costs...1965-1973."

NOTES: *As of March and September (exclusive of Big Cities).

**Annual Average (based on number of samples).

TABLE 16

ANNUAL (MEDIAN) SCHOOL CONSTRUCTION COSTS PER SQUARE FOOT IN NEW YORK STATE AND NEW YORK CITY IN DOLLARS (Exclusive of Site, Fees, and Incidentals)

Year		New York State*				New York City			
		Elem	Middle	H.S.	All	Elem	Middle	H.S.	All
1965		...	...	...	...	...	...	23.52	23.52
1966	M	18.75	17.83	17.16	18.00	...	...	...	...
	S	19.73	19.95	18.39	19.17	...	...	...	...
	**	...	...	...	18.71	...	...	...	...
1967	M	19.73	21.76	20.14	19.96	...	...	...	...
	S	22.82	29.08	20.23	21.63	...	...	...	...
	**				20.66	2 .71	27.12	26.76	26.94
1968	M	22.07	19.01	23.23	20.63	...	...	...	...
	S	20. 3	19.49	20.31	19.58	...	...	...	...
	**	...	...	...	19.99	27.73	29.65	29.20	29.30
1969	M	21.72	23.10	23.57	22.44	...	...	...	...
	S	23.58	26.39	23.20	23.50	...	...	...	...
	**	...	...	...	23.14	38.26	38.23	38.96	38.23
1970	M	22.84	27.50	22.84	23.27	...	...	...	...
	S	26.38	23.16	29.84	26.22	...	...	...	...
	**	...	...	...	24.66	58.32	43.78	61.19	52.13
1971	M	26.43	31.70	30.38	28.68	...	...	...	...
	S	26.60	32.67	29.98	26.79	...	...	...	...
	**	...	...	...	27.80	54.68	46.95	45.17	47.13
1972	M	28.13	33.63	25.89	29.39	...	...	...	...
	S	28.29	28.94	34.60	28.32	...	...	...	...
	**	...	...	...	28.66	53.90	49.40	41.34	50.00
1973	M	27.87	27.03	28.84	27.87	...	...	...	...
	S	27.74	31.45	...	29.17	...	...	...	...
	**	...	...	...	28.39	55.03	49.95	...	54.52

SOURCES: Division of Educational Facilities Planning, NYSED, Semi-Annual School Cost Reports..., March 1966 to September 1973 and Office of School Buildings, New York City Board of Education, "School Construction Costs...1965-1973."

NOTES: *As of March and September of year (exclusive of Big Cities).

**Annual Average (based on number of samples).

TABLE 17

MASSACHUSETTS SCHOOL BUILDING COSTS PER SQUARE FOOT
(In June 1971 Dollars)

	High Schools		Elementary & Middle Schools	
	Urban	Suburban	Urban	Suburban
1971	$38.76/sf	$33.01/sf	$39.94/sf	$32.75/sf
1972*	41.86	35.65	43.14	35.37
1973*	45.21	38.50	46.59	38.20

SOURCE: Campbell, Aldrich and Nulty, A Systems Approach for Massachusetts Schools: A Study of School Building Costs for the Massachusetts Advisory Council on Education, Final Report, p. 111 ff., Boston, Mass., 1972.

*Estimate based on annual inflation rate of 8%.

TABLE 18

AVERAGE SITE COSTS PER ACRE IN
NEW YORK CITY AND NEW YORK STATE

Year	New York State*	New York City
1965	...	$204,000
1966	$1506	161,000
1967	1999	156,000
1968	1476	216,000
1969	1475	248,000
1970	2388	407,000
1971	3241	323,000
1972	3584	...
1973	1118	...

SOURCE: Data provided by the Bureau of School Financial Aid, New York City Board of Education, and Division of Educational Facilities Planning, NYSED, Semi-Annual School Cost Reports..., March 1966 to September 1973 inclusive.

*Median.

TABLE 19

SITE COSTS IN NEW YORK CITY PER PUPIL: 1962-1972

Year	Average	Based on Trend Analysis
1962	489	392
1963	406	411
1964	352	430
1965	364	449
1966	588	469
1967	376	488
1968	565	507
1969	374	526
1970	754	546
1971	515	565
1972	(N.A.)	584

SOURCE: Data provided by the Bureau of School Financial Aid, and the Office of School Buildings, New York City Board of Education.

TABLE 20

CHANGES IN PER PUPIL CONSTRUCTION COSTS AND COST ALLOWANCES IN NEW YORK

Year	New York State*		New York City		State Aid Cost Allowance		National Index
	Per Pupil Cost--All	% Change over prior year	Per Pupil Cost--All	% Change over prior year	High School Cost Per Pupil	% Change over prior year	% Change
1966	1700	...	...	...	2165	2.9	...
1967	1931	13.6	2435	...	2238	3.4	...
1968	1960	1.5	3000	20.7	2344	4.7	6.0
1969	2346	19.7	3876	29.2	2546	8.6	9.4
1970	2248	-4.2	5241	35.2	2664	4.6	7.75
1971	2758	22.7	4875	-7.0	2855	7.2	11.2
1972	2955	7.1	5282	8.3	3128	9.6	...
1973	2748	-7.0	5055	-4.3	3320	6.1	...
Annual Averages							
1966-1971	...	10.7	...	19.5	...	5.2	8.6
1966-1973	...	7.6	...	13.7	...	5.9	...

SOURCES: Office of School Buildings, New York City Board of Education, Division of Educational Facilities Planning, NYSED, Semi-Annual School Cost Reports..., March 1966 to September 1973, inclusive, "Monthly Cost Allowances per Pupil...," January 1964 to July 1973, and U.S. Department of Commerce, Construction Review, 1965 Annual Report through September 1973, inclusive.

*Exclusive of Big Cities.

TABLE 21

AVERAGE TIME TO SCHOOL OPENING (ACQUISITION TIME) AND DESIGN/CONSTRUCTION TIME FOR FOUND SPACE SCHOOLS IN MONTHS, AND AS COMPARED TO NEW SCHOOL BUILDINGS, PERCENT

Location	School Name	Extent of Renovation*	Design/Construction Time		Total Acquisition Time	
			Months	As % of New	Months	As % of New
New York City	(Average for New School)	...	24	...	84	...
	P.S. 219 K	3	4½	19	13	15
	J.H.S. 57 K	2	5	21	13	15
	P.S. 26 X	1	4	17	17	20
	P.S. 232 X	4	9	38	20	24
	P.S. 211 X	4	12	50	21	25
	I.S. 252 K	3	9+	40	21	25
	James Monroe H.S.	3	7	29	24	29
	William Taft H.S.	4	13	54	24	29
	Block School	3	9	38	30	36
	T. Jefferson H.S.	4	10	42	30	36
	Newtown H.S.	4	16	67	36	43
	P.S. 85 X	1	...	...	38	45
	Average	...	9	38	24	29
Yonkers	(Average for New School)	...	24	...	48	...
	Yonkers Career Center	3	8	33	14	29
Massachusetts	(Average for New, ±100,000 sf)	...	30	...	40	...
	Lowell H.S. Annex	2	.1	0	2	5
Boston	(Average for New School)		24	...	40	...
	Dennis C. Haley	4	2	8	8	20
	J.L. Barron	3	5	21	10	25
	Bradford Annex	3	6	25	10	25
	S. Boston H.S. Annex	5	1.5	6	12	30
	Hernandez Bilingual	5	12	50	16	40
	Average		5.3	22	11.2	28
Pennsylvania	(Average for New School	...	20	...	36	...
	Pennridge J.H.S.	3	3	15	9	25
Philadelphia	(Average for New School)	...	32	...	66	...
	Harrington Annex (Church)	1	0	0	±3	5
	PAS-ILC	4	...	...	6	9
	Bartram Commercial H.S.	3	10	31	18	27
	Olney H.S.	4	10	31	18	27
	Harrington Annex (Coal)	4	5	16	18	27
	Average	...	6	19.5	12.6	19
All	Grand Average	3.2	6.8	28	17	25

*The meaning of the numbers, rating the extent of renovation, is: (1) Cleaning and cosmetic patching; (3) Systems upgrading, minor structural changes, and non-structural modifications; (5) Complete gutting and new systems; and (2) and (4) are in between.

TABLE 22

BUILDING ALLOWANCES, SITE COSTS IN NEW YORK CITY

TOTALS	Construction Costs*	Total Max. Allowance*	Site Cost	Site as Percent Allowance
1964-65	$ 79,093,413	$ 61,292,351	$ 11,537,349	18.82
1965-66	84,039,162	70,330,304	11,211,229	17.36
1966-67	26,542,320	17,683,019	4,604,579	26.04
1967-68	51,965,787	38,638,567	6,106,992	15.81
1968-69	54,659,085	30,269,082	8,184,936	27.04
GRAND TOTAL	$296,299,767	$218,213,323	$42,645,085	19.54

Average Site Cost per Acre 1964-69 $ 220,845

SOURCE: The Fleischmann Report, V. 2, p. 111. Based on data provided by the Bureau of School Financial Aid, New York City Board of Education.

NOTE: Schools constructed on city-owned or donated sites are not included; Early Childhood Centers and one "600" school not included.

*Including sites and incidentals.

TABLE 23

BUILDING EXPENSES AND STATE AID IN NEW YORK STATE 1969-70 SCHOOL YEAR*

	New York State		New York City		New York State excluding NYC	
	Amount	%	Amount	%	Amount	%
Total building expenses	$424,882,996		$146,642,817		$278,240,179	
Total debt service	415,226,954		142,729,455		272,497,499	
Approved debt service	380,900,618		120,881,981		260,018,637	
Approved debt service as a percent of total debt service		91.73%		84.69%		95.42%
Approved capital expenses	9,656,042		3,913,962		5,742,080	
Total approved expenses	390,556,660		124,795,943		265,760,717	
State aid for approved debt service	186,419,809		34,209,601		152,210,208	
State aid as a percent of approved debt service		48.94%		23.97%		58.54%
State aid for approved capital expenses	6,508,303		1,162,447		5,345,856	
State aid as a percent of approved capital expenses		67.40%		29.70%		93.10%
Total State aid paid	192,928,112		35,372,048		157,556,064	
Total State aid as a percent of approved expenses		49.39%		28.30%		59.28%
Total State aid as a percent of total expenses		45.41%		24.12%		56.63%

SOURCE: The Fleischmann Report, Volume II, p. 107.

*Based on: State Aid for Elementary and Secondary Education in New York State as Apportioned in 1969-70, NYS Education Dept., Division of Educational Finance, and Statistics supplied by N.Y. City Board of Education, Bureau of School Financial Aid, June 3, 1971.

TABLE 24

DEBT SERVICE AND STATE AID IN NEW YORK STATE
1969-1970

	(T.D.S.) Total Debt Service for Building	(A.D.S.) Approved Debt Service	(C.A.) Approved Capital Outlay	(S.A.) State Aid on Building			PER CENT	
				On D.S.	On C.O.	A.R.	S.A./T.D.S.	A.D.S./T.D.S.
Statewide	415,226,954	380,900,618	9,656,042	186,419,809	6,508,303	.490	44.90	91.73
N.Y.C.	142,729,455	120,881,981	- 0 -	34,209,601	- 0 -	.283	23.97	84.69
Yonkers	4,811,962	3,596,739	- 0 -	1,082,618	- 0 -	.301	22.50	74.75
Albany	1,386,959	1,073,919	- 0 -	233,040	- 0 -	.217	16.80	77.43
Syracuse	1,154,055	1,054,346	519,095	493,434	242,936	.468	42.76	91.36
Rochester	3,655,858	3,253,889	- 0 -	1,090,053	- 0 -	.335	29.82	89.00
Buffalo	5,228,006	4,499,749	- 0 -	2,429,864	- 0 -	.540	46.48	86.07
Rest of State	257,260,659	246,539,995	9,136,947	146,881,199	6,265,367	.596	57.09	95.83
Big 6	157,966,295	134,360,623	519,095	39,538,610	242,936	.294	25.03	85.06
PERCENTAGE OF TOTAL (100%):								
Big 6	38.0	35.3	5.4	21.2				
N.Y.C.	34.4	31.7	- 0 -	18.4				
Rest of State	62.0	64.7	94.6	78.8				

SOURCE: Data provided by the New York State Education Department, Division of Educational Financing, and the New York City Board of Education, Bureau of School Financial Aid.

TABLE 25

APPORTIONMENT OF DEBT SERVICE AND STATE AID FOR SCHOOL BUILDING IN NEW YORK STATE: 1965-1970

	New York City			Six Largest Cities*			State Remainder		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
1965-66	38.0	38.1	26.0	42.3	42.3	29.3	57.7	57.7	70.7
1966-67	38.6	37.7	25.2	42.7	41.7	28.4	57.3	58.3	71.6
1967-68	38.8	37.5	23.4	43.1	41.6	26.7	56.9	58.4	73.3
1968-69	37.4	35.5	21.2	41.6	39.4	24.4	58.4	60.3	75.6
1969-70	34.4	31.7	18.4	38.0	35.3	21.2	62.0	64.7	78.8

SOURCE: The Fleischmann Report, V. 2, P. 110. Based on data provided by the New York State Education Department, Division of Educational Financing and the New York City Board of Education, Bureau of School Financial Aid.

NOTES: Column 1: Percentage of Total Debt Service for Building (Total = 100%).
Column 2: Percentage of Total Approved Debt Service foor Building (Total = 10C%).
Column 3: Percentage of Total State Aid for Building (Total = 100%).

*Includes Albany, Buffalo, New York City, Rochester, Syracuse and Yonkers.

TABLE 26

NEW YORK CITY DEBT SERVICE FOR STATE BUILDING AID: 1962-63 to 1970-71*

Year	Total Debt Service	Approved Debt Service	Aid Ratio	State Aid	State Aid/ Total Debt Service	Approved Debt Service/ Total Debt Service
1962-63	$ 85,409,947	$ 85,409,140	.398	$ 33,992,838	39.80	99.99
1963-64	88,423,781	88,394,450	.387	34,208,652	38.69	99.97
1964-65	99,793,134	99,025,368	.367	36,342,310	36.42	99.23
1965-66	112,667,142	108,729,018	.341	37,076,595	32.91	96.50
1966-67	128,080,258	118,054,442	.322	38,013,530	29.68	92.17
1967-68	139,898,284	124,844,859	.304	37,952,837	27.13	89.24
1968-69	143,256,005	124,967,417	.297	37,115,323	25.91	87.23
1969-70	142,729,455	120,881,981	.283	24,309,601	23.97	84.69
1970-71	150,771,922	123,248,053	.283	34,879,199	23.13	81.74

SOURCE: The Flesichmann Report, V. 2, p. 110.

*Prepared by: Board of Education of Education of the City of New York, Bureau of School Financial Aid, June 3, 1971.

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TABLE 27

FOUND SPACE SCHOOLS VISITED ARRANGED BY SPATIAL AND PROGRAMATIC CATEGORIES

SELF-CONTAINED CLASSROOMS			OPEN SPACE			OTHER
Traditional Program	Non-Traditional Program	Special Ed. and Vocational Prog.	Open Space Program	Used as Self-Contained Classroom	Special Ed. & Vocational	
P.S. 219	P.S 232	Schl for Deaf (Inst of Crippled & Disabled)	P.S. 26 (Burnside Manor)	P.S. 211	School for Deaf (Showroom)	Block School
J.H.S. 57	James Monroe H.S.	Yonkers Career Center	P.S. 85	Lowell H.S. Annex	Westchester BOCES (Church)	Ethnic Museum
I.S. 252	Wm. Taft H.S.		P.S. 61 (Fairmont Theater)		Bartram Commercial H.S.	Metro Media Bldg. (Nassau County BOCES)
Newtown H.S.	Clinton J.H.S.		Park East H.S. (Church)			West BOCES Rolling Bus
T. Jefferson H.S.	Park East H.S. (Man Schl Music)		West Side H.S.			
Bradford Annex	Hernandez Biling		Acorn School			
J.L. Barron Sch	Bartram (Human Services)		Harlem Prep.			
S. Boston H.S.			Dennis Haley			
Harrington (Coal Bldg)			Pennridge J.H.S.			
Harrington (Church)			PAS-ILC			
Olney H.S. Annex						
(11)	(7)	(2)	(10)	(2)	(3)	(4)

TABLE 28

LIFETIME COSTS OF FOUND SPACE FACILITY ALTERNATIVES AND AS PERCENT OF NEW SCHOOL BUILDINGS (NO RESALE)

School	Years	Total Building Cost			...As Percent of New		Lease as % of Purchase
		Lease	Purchase	New	Lease	Purchase	
Newtown H.S.	25	$6,662,100	5,039,639	5,837,708	(113)*	86	131
Sumner Ave.	10	443,025	443,148	3,367,263	15	(14)	102
Wm. Taft H.S.	10	1,397,304	1,826,289	2,298,246	61	(80)	77
I.S. 252	15	1,212,210	1,241,350	1,978,312	61	(63)	98
P.S. 219	15	1,292,491	991,667	1,652,676	78	(60)	130
James Monroe	5	129,046	138,643	379,090	34	(37)	93
T. Jefferson	[illegible]	1,365,822	1,659,769	1,863,253	74	(89)	82
P.S. 26	10	1,051,259	1,053,840	2,238,659	47	(47)	100
P.S. 211	15	1,836,751	2,789,066	3,035,100	61	(92)	66
P.S. 232	10	3,001,11C	3,296,886	3,748,554	80	(88)	91
Block School	3	180,280	216,947	428,496	42	(51)	83
P.S. 85	25	...	892,722	1,582,152	...	56	...
Lowell H.S.	1	152,309	479,652	2,196,703	7	(22)	32
S. Boston H.S.	20	...	2,146,241	2,278,030	...	98	...
J.L. Barron	30	...	1,404,867	2,232,361	...	63	...
Hernandez	25	...	1,566,066	1,513,862	...	103	...
Dennis Haley	30	...	2,933,527	3,085,874	...	95	...
Pennridge	30	...	789,682	1,523,624	...	52	...
Harrington(Coal)	25	...	539,858	951,865	...	57	...
Bartram Commercial	25	...	511,893	894,863	...	57	...
Olney H.S.	25	...	2,628,308	4,691,859	...	56	...
Harrington(Church)	4	40,778	...	526,000	8	...	...
Mean					47%	72%	88%
Standard Deviation					26	21	28
(No. Samples)					(12)	(10)	(12)
Mean (All)						65	
Standard Deviation						25	
(No. Samples)						(21)	

*Parenthesis indicates that cost projections are for hypothetical alternative.

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TABLE 29

COMPARISON (IN PERCENT) OF SAMPLE LIFETIME COSTS OF SCHOOL FACILITY ALTERNATIVES UNDER VARYING LIFE USE (IN YEARS)*

School	Years of Use	Total Building Cost			Percent		
		Lease	Purchase	New	Lease/New	Purchase/New	Lease/Purchase
Newtown H.S.	1	396,047	2,333,265	3,939,304	10	59	17
	3	1,130,396	2,518,998	4,206,550	27	60	45
	5	1,802,974	2,710,695	4,486,027	40	60	66
	8	2,713,884	3,009,465	4,929,287	55	61	90
	10	3,266,462	3,216,483	5,241,946	62	61	102
	14	4,269,064	3,651,466	5,931,207	72	62	117
	20	5,597,534	4,367,461	7,056,219	79	62	128
	25	6,622,100	5,039,639	5,837,708	113	86	131
	30	7,635,973	5,801,950	6,035,279	127	96	132
P.S. 85-BIL	1	...	165,425	715,334	...	23	...
	3	...	209,147	758,555	...	28	...
	5	...	254,694	804,103	...	32	...
	8	...	327,708	877,116	...	37	...
	10	...	379,807	929,215	...	41	...
	14	...	493,410	1,042,819	...	47	...
	20	...	692,579	1,241,987	...	56	...
	25	...	892,722	1,582,152	...	56	...
T Jefferson H.S.	5	1,018,820	1,309,549	1,570,843	65	83	78
	10	1,365,822	1,659,769	1,863,253	74	89	82
	14	1,622,859	2,033,812	2,227,913	73	91	80
	25	2,317,501	2,743,879	2,814,650	83	98	85
P.S. 26/ Burnside Manor	5	577,662	777,297	1,952,247	30	40	74
	10	1,0[illegible]1,259	1,053,840	2,238,659	47	47	100
	14	1,394,454	1,373,708	2,722,291	51	50	102
	20	1,882,436	1,670,252	2,890,443	65	58	113
	25	2,289,296	2,022,758	3,249,257	70	62	113
P.S. 211	5	662,370	1,835,810	2,002,509	31	92	34
	10	1,273,510	2,246,591	2,453,120	52	92	56
	15	1,836,751	2,789,066	3,035,100	61	92	66
	20	2,337,642	3,064,630	3,369,139	70	91	76
P.S. 231	10	3,001,110	3,296,886	3,748,554	80	88	91
	14	3,879,930	3,755,269	4,186,169	93	90	103
	20	4,984,801	4,426,808	4,825,056	103	92	112
	25	5,766,985	4,972,101	5,341,698	108	93	116
Block School	3	180,280	216,947	428,496	42	51	83
	5	287,782	230,509	456,731	63	51	125
	10	521,531	269,678	531,374	98	51	193
	14	680,842	307,308	597,194	114	51	222
	20	889,501	376,631	706,030	126	53	236
	25	1,047,686	448,887	809,641	129	55	233

* Data used for Graphs 1, 2, and 3.

TABLE 30

RELATIVE TOTAL LIFETIME COSTS AND UNIT VALUES WITH CHANGING RATES OF INTEREST FOR LEASED AND PURCHASED BUILDINGS COMPARED TO A NEW SCHOOL BUILDING - IN THE CASE OF NEWTOWN H.S. ANNEX*

ROIT	ANNUAL SQUARE FOOT VALUE				
	DOLLARS			PERCENT	
	Lease(L)	Purchase(P)	New(N)	L/N	P/N
1.0%	$ 497.48	$ 451.40	$ 1,458.78	34%	31%
2.0	471.22	402.28	1,080.35	44	37
4.0	424.46	326.51	629.75	67	52
6.0	384.29	272.22	399.60	96	68
8.0	349.60	232.49	275.35	127	84
12.0	293.23	180.18	160.61	181	112
25.0	183.70	111.88	69.79	263	160
	TOTAL BUILDING COST				
1.0	4,228,544	9,592,341	55,798,195	8	17
2.0	4,005,333	8,548,533	41,323,552	10	21
4.0	3,607,924	6,938,312	24,088,056	15	29
6.0	3,266,462	5,784,724	15,284,529	21	38
8.0	2,971,571	4,940,454	10,532,312	28	47
12.0	2,492,488	3,828,915	6,143,270	41	62
25.0	1,561,421	2,377,469	2,669,306	58	89

*Data compiled on this table are used for Graph 5. Life use for leased, purchased, and new school buildings are respectively 10, 25, and 45 years.

APPENDIX C

COST ASSUMPTIONS AND DATA SOURCES FOR BUILDING COST ANALYSES

NAME: School name - school identification and building type.

DATE: Allows for the entry of the date of school opening (or any other date desired). In this analysis two dates are written in: the first signifies the date the school opened; the second indicates the month construction began.

General

RIOT: Prevailing rate of interest - on money invested. RIOT is entered as a decimal. RIOT represents rate of return as opposed to rate of interest on borrowed money. Where long term bond interest rates at the time of construction for a district in question are known, RIOT is assumed to be one percent less than that rate of interest. Where such values are not known, it is assumed to be the same as that of another similar locality for which values are known, or, in a few cases guestimated.

SFP: Square feet per pupil, standard - based on state or local averages for different school levels. The standard for New York City was taken to be 10 square feet per pupil less than the New York State ("Upstate") averages.

CA: Cost allowance - for state aid pusposes as per the New York State building aid formula. The cost allowance is based on the month contracts are signed or construction begins (see DATE above), is taken from the NYSED cost allowance index, and includes the full allowance (construction plus incidentals). For school buildings not in New York State CA is zero. (See PAIDP, PAIDN, and RAID below).

AR1: Aid ratio - for the school district (in New York State only) in the base year (first year of school operation).

CHAR: Change in the aid ratio - for the school district (in New York State only). Derived by linear regression analysis of the district's aid ratio from 1962-3 to 1970-71. CHAR is the slope of the trend.

(AR1 and CHAR, like CA, are set at zero for school buildings outside New York State. For states with aid formulas like New York - Pennsylvania, for example - these data items can be used).

TR1: Tax rate - of the municipality (or school district) in the first year property (either site or building) is owned by the school district. The tax rate, converted, if necessary, to per hundred dollars of assessed valuation, is entered as a percent.

CHTR1: Change in tax rate - derived by linear regression analysis of the district or municipal tax rate for as many years as figures are available (e.g. 6 for New York City, 7 for Boston).

Purchased Building

CB: Found building purchase price - when this cost figure is hypothesized, rather than based on actual figures, (as with New York City leased buildings) the purchase price is derived from the assessed valuation on the assumption that in New York City the assessed value is 60 percent of the full market value. (In theory New York City property is assessed at full value; the actual practice of the theory is disputed. The 60 percent value posited here is a very general estimate based on professional opinion.)

CR: Renovation cost of a purchased building - based on actual figures. In the case of New York City leased buildings, this figure is based on OSB estimates, or the negotiated amount on which the lease is figured when renovations are performed by the landlord and amortized through the lease.

CF2: Fees - where actual figures are not available and not included in the above costs the amount of the fee is calculated based on AIA guidelines, minus 1 percent.

DSP: Debt service on a purchased building - actual figures are used when known. Otherwise, debt service is figured on the basis of current bond terms at the time of purchase and renovation, for the full cost of the converted building (CP, or CR, CB, and CF2 summed) - unless the practice is to issue debt for only part of the expenditure as, for example, when building purchase is funded separately. When no bond terms are available the total cost of the converted building (CP) is taken as the present value, and DSP is set at zero.

VP: Principal of the Bond - if not known it is generally assumed to be the full cost of the building (CP) when bonds are issued. (For qualifications to this rule see DSP above.)

N2: Bond term - in years. Based on actual values as in DSP above. Otherwise set at zero.

SFT2: Square footage of the purchased building - actual figures (or if hypothesized purchase, actual figures under the leasing arrangement).

RC2: Rated capacity of the purchased building - actual figure is used when known, based either on officially rated capacity or, when official estimates are unavailable, on actual

usage. If these figures are unavailable, RC2 is set at zero and is calculated by the program based on SFT2 and SFP.

PAIDP: State aid, totalled - if state aid is calculated other than by the New York State building aid formula the total present value of that reimbursement is entered here. If a converted, purchased building in New York State is ineligible for building aid ".1" is entered here. For those Massachusetts and Pennsylvania converted school buildings which are eligible for state aid PAIDP is based on a fixed percentage of the total building cost. For the ineligible buildings PAIDP is zero.

ATP: Annual tax on the purchased building - prior to purchase by the school district. Actual figures are used, when known, based on the first year the building is owned by the school district. Otherwise a zero is entered and the annual property tax is calculated by the program based on the assessed value of the property.

TAVP: Assessed property value for purchased building - prior to purchase by the school district. When ATP is known, TAVP is generally disregarded. Otherwise it is based on actual figures. When actual figures are unavailable, but a purchase price is known, TAVP is calculated as a percentage of the actual market value according to the assessing practices of the municipality. (Such calculations, necessary for Philadelphia school buildings, assumed assessed value at 40 percent of full value rather than the official, theoretical, 60 percent, again based on professional opinion).

L2: Purchased building expected life usefulness - in years. The composite life use is based on architect estimates; generalized input generously provided by the Manufacturer's Appraisal Company (in Philadelphia); considerations of existing building condition, structure, use, location, and extent of renovations; age, use and renovations to the original building, all of which result in a fundamentally subjective determination.

CAGE1P: Operations and Maintenance annual inflation factor, for purchased building - based on linear regression analysis of existing figures in a few cases for which sufficient data is available to establish a trend; otherwise assumed to be .10 (10 percent) for New York City schools (based on the experience of Columbia University, Teachers College, and to a limited extent, professional private management companies), and .08 (8 percent) for schools in other places.

OMP: Annual operations and maintenance costs - for the first year of school operation. Based on actual costs,

extrapolated or adjusted to the first full year of operation when necessary. When specific costs are unavailable school district predictions or averages are used. When no local operations and maintenance cost data is available nation-wide trends as reported by American School and University magazine, (1972 series), are used.

RESALP: Resale value of the purchased building - subsequent to last year of expected use. Estimates are based on consideration of present cost and renovation expense less anticipated restoration cost. When RESALP is estimated program is run again with RESALP as zero.

New School Building (Hypothetical)

CS: Site cost - for New York City site costs are calculated based on an average cost per pupil in the year prior to the year construction would have begun. (Per pupil site cost averages are based on data provided by BSFA and OSB.) For Philadelphia schools the site cost is included in the cost of construction (CC below). For other Pennsylvania schools and Massachusetts schools site costs are based on estimated averages by school district officials.

CC: Construction cost of new school - based on average costs per square foot, by school level, in the year construction began, for New York City, non-Big City districts in New York State, Massachusetts (broken into categories of urban and suburban), Philadelphia, and Pennsylvania statewide. For Philadelphia and Pennsylvania schools, CC includes all building costs (i.e. sites and fees). Data for calculations is based on figures provided by OSB for New York City; DEFP for New York State remaining; MACE for Massachusetts; PBE for Philadelphia; and DPI for Pennsylvania statewide.

CF3: Fees - (same as CF2).

DSN: Debt service on new school building - (same as DSP).

VN: Principal of the Bond - (same as VP).

N3: Bond term - (same as N2).

SFT3: Square footage of the new building - hypothesized based on the product of the rated capacity and SFP.

RC3: Rated capacity of the new school building - assumed to be the same as the rated capacity of the found space building (either leased or purchased).

PAIDN: State aid, totalled - (same as PAIDP, with the exception that state building aid is always assumed for new school buildings).

ATN: Annual tax on the property of the new school building - prior to purchase by the school district. Depending on data availability this figure is assumed to be ATP, or zero, to be calculated by the program on the basis of TAVP.

TAVN: Assessed property value for the new school building - prior to purchase by the school district. Depending on data availability and circumstances this figure is taken to be TAVP or 4 times the assessed value of the site cost (assuming a potential taxable value of improved property).

L3: New school building expected life usefulness - in years. The composite life use is taken to be 45 years for all new school buildings (according to the Manufacturer's Appraisal Company).

CAGE1N: Operations and Maintenance annual inflation factor for new school buildings - (same as CAGE1P).

OMN: Annual operations and maintenance costs - for the first year of operation. Based on school district predictions or averages when available. Otherwise based on nation-wide trends as reported by American School and University magazine (1972 series).

RESALN: Resale value of the new school building - assumed to be zero.

Leased Building

RENT: Annual Rental payments - based on actual figures.

RAID: State aid for leased building - not available, in most instances, for leased school space in New York State. When applicable RAID is calculated as a fixed percentage of RENT.

L1: Leased building expected life usefulness - in years. Determined by the length of the lease. Based on actual figures.

RENO: Renovation costs - paid directly by the school district, separate from rental payments. (If renovation costs are financed by the landlord and amortized through the lease such payments would be included in RENT.) Based on actual figures.

RY: Renovation year - year renovations performed. Based on actual figures. RY is measured as number of years from the base year or first year of the lease and applies only to RENO. RY is "0" if RENO is performed early in the first year or prior to the beginning of the lease term.

(Note: When renovation expenditures were made in more than one year the various costs were adjusted to the present worth at a specific point in time - RY - so that single values could be entered for each of these data items. Also, when a lease option provided for a different annual rental beginning in a future year, RENO and RY were used to adjust the present value of the different amounts. For example, when RENO is a negative number it became such because of adjustments due to a lease option which provides for a reduced annual rental beginning in a future year - because landlord performed renovation costs have been amortized.)

SFT1: Square footage of leased building - (same as SFT2).

RC1: Rated capacity of leased building - (same as RC2).

(Note: The data entered into this set of program runs uses rated capacity figures as the one common factor in each of the building alternatives within a given run. This decision was based on the need to have a common basis for comparison. The program does not require that all three RC values be the same.)

CAGE1R: Operations and Maintenance annual inflation factor for rented building - (same as CAGE1P).

OMR: Annual operations and maintenance costs - (same as OMP).

SOURCES OF INFORMATION
(and abbreviations)

Data Sources	Abbreviation
New York:	
New York State Education Department	NYSED
- Division of Educational Facilities Planning	DEFP
- Division of Educational Finance	DEF
- Bureau of Educational Finance Research	BEFR
New York City Board of Education	NYCBE
- Bureau of School Financial Aid	BSFA
- School Planning and Research Division	SPRD
- Office of School Buildings	OSB
New York City (Tax) Collector (for each Borough)	NYCC
Board of Cooperative Educational Services	BOCES
Massachusetts:	
(Campbell, Aldrich and Nulty) A Systems Approach for Massachusetts Schools: A Study of School Building Costs for the Massachusetts Advisory Council on Education, Final Report, 1972.	MACE
Boston Public Facilities Department	PFD
Boston School Committee (Board of Education)	BSC
Pennsylvania:	
Pennsylvania Department of Public Instruction, (Bureau of School Construction)	PDPI
Philadelphia Board of Education (School Facilities Division)	PBE
General:	
American Institute of Architects, (Statement of the Architects Services, 1971; and Schedule of Compensation, New York Chapter, 1969).	AIA
"Maintenance and Operations Cost Study," American School and University, February, April, June, and August, 1972 (Series).	AS&U
Manual of Planning Standards for School Buildings.	NYSMPS

APPENDIX D

COMPUTER PROGRAM, DIRECTIONS FOR ITS USE, AND SAMPLE OF THE OUTPUT

Design of the Program

Language

The program is written in Fortran IV.

Overall Design

The three sets of calculations - the lifetime cost analysis of a leased building, a purchased building and a newly constructed school building respectively - are arranged one after another. Within a single data run the costs of each of these three different alternatives is analyzed. If one or more of these facility/financing alternatives is not being considered (or if basic data is unavailable) that alternative will be bypassed. A series of cost analyses for one or more facility/financing alternatives is accomplished by separate data runs. Thus, for example, if the lifetime cost of two different purchased buildings and three possible new school designs is desired, three separate data runs are necessary. Or if there are four different options under discussion regarding the terms of a lease and the extent of renovations of a prospective rented building, four separate data runs would be required. Re-entering all new data, however, is not necessary. For sequential runs of the program only those data items which are different from the preceding run must be changed. (See "Reuse of Data Values and Resetting Data Items," and "Sensitivity Analysis" respectively, below, for more information on the use of this aspect of the program.)

Subroutines

Certain operations which are used at various times in the main program are called from subroutines. These include:

- Present value formula
- Present worth formula
- New York State building aid formula
- Annual property tax formula
- Future year annual operations and maintenance cost formula.

This design allows for relatively easy program modification to meet the needs of other localities (e.g. with state building aid formulas different from New York State's) or to revise formulae based on new discoveries of empirical relationships (e.g. the pattern of annual inflation of operations and maintenance costs). It is for this reason that some of these operations (which are only one statement and would otherwise be placed in the main program when required) are performed in subroutines.

Program Modification

As stated above one way in which the program can be

modified to meet local needs or revised based on new information is through the subroutines. In addition, since the separate facility/financing alternatives are stacked, one after another, it is possible to add other such alternatives (or remove an existing one) while retaining the basic integrity of the program. (Such a modification, however, would entail the tedious, though mechanical, revision of the input-data and the output - the format and writing of resultant cost figures.)

Data Entry

Up to 46 data values, plus identification of the school (name) and a date, may be entered in the program. Not all 46 items need be entered for the program to work properly.

Note: A decimal point must be placed at the end of all whole numbered values.

Categories of Data

Data is grouped in four categories: general, leased building, purchased building and new school building. With one exception, detailed below, data items may be entered in any order within a given program run, the above-mentioned organization notwithstanding. Each data item in the general category can be used in two or more of the facility/financing cost analyses.

Reuse of Data Values and Resetting Data Items

When the program is run a number of times in succession. the previous value for each data item remains unless a new value is entered. That is, in successive program runs, only those new data items need be changed. While this facilitates the testing of parameters which influence facility alternatives, the user must be careful that unwanted data items from a prior run do not corrupt the results of a current cost analysis. Data items which are not pertinent for a current run can be set at zero.

As written into the program all data values are zero (with certain qualifications as noted below) until the first data set is entered.

Bypassing a Facility/Financing Alternative

In starting to use the program the costs of only those alternatives for which data is entered will be analyzed. Since data values from an initial data set remain for continued use until changed, an initially analyzed alternative will be recomputed even though not required or desired.

To bypass calculations for a particular alternative for which data values are available from a prior run the following data values need be set to zero:

- For a leased building: RENT and RAID
- For a purchased building: CB, CR, and CF2
- For a new school building: CS, CC, and CF3.

Failure to reset these values to zero, however, will not corrupt computations of the cost of another alternative. The only effect will be that the computed results will be written on the output.

If, however, a particular building is a gift (or otherwise obtained free), with no purchase, rental, renovation or fee costs, in order for the other lifetime costs of that building to be analyzed (i.e., so the cost analysis will not be bypassed) enter a value of .1 in RENT, CB, or CS respectively if it is a rental, purchase or new building situation.

Rules for Data Items

- NAME: To enter a school name and date or other identifying information three statements are necessary. The first must say "NAME." (This informs the computer that the next two statements follow.) On the second statement write the name of the school or other identifying information (up to 30 characters), and on the third statement write the date or other identifying information (up to 24 characters). If no information is desired in one or the other of these categories enter a blank statement (or card if cards are used) in its place. NAME information is not used in computations but merely labels output sheets. If no labels are desired, enter none of these statements.

Note: If a NAME statement is entered the two additional statements must follow, even if blank. Otherwise a data value intended for computation will be read as an identifying label.

- Entering data values/decimal points: With the exception of NAME, as noted above, each data value is entered on a separate statement with the data argument written first, beginning in column 1 (e.g. ROIT), followed by the pertinent value, starting in column 6, and including a decimal point in the appropriate place.

- Percents as decimals: Data items which are percentages are to be entered as the decimal equivalent. This rule pertains to the following data arguments:

- ROIT
- AR1
- CHAR
- TR1
- CHTR1
- CAGE1R
- CAGE1P
- CAGE1N

- Concluding a data set: The word "GO" written alone on a statement at the end of a data set signals that all new data values have been entered for that data run. To signal the end of all data sets (i.e., the complete job), the word "STOP" must be written alone on a statement and placed immediately after the last "GO" statement of the last data set.

- Unallowed values of zero: Certain data items, under certain circumstances cannot be zero or the program will not run. These values are used as the divisor in division operations and as such they cannot be zero. When such an error occurs in the data an error message reading "Illegal zero in variable ___" will be printed.

Only ROIT (i.e., the rate of return on money invested, or interest rate) however, can never be zero.

The values L1, L2, L3, and SFT1, SFT2, and SFT3, (building life use expectancy and total building square footage respectively for each of the three alternatives) must not be zero unless the cost alternative to which the particular value(s) pertains is bypassed. If the cost alternative is bypassed these data values will not be called.

Also, SFP, a square footage per pupil standard, must not be zero if the rated capacity of any of the financing/facility alternatives analyzed is not known (i.e., RC1, RC2, or RC3). SFP is used to approximate a rated capacity for a building when that figure is not known.*

Data Items and Card Setup

Column 1	Column 6**	Description of Item	Card Sequence
(General Data)			
NAME		(Follow with two statements identifying school and date as follows:)	...***
"Name"	30	School name	Follows "NAME"
"Date"	24	Date	Follows school name
ROIT	.3	Rate of interest (or rate of return on money invested)	...
SFP	4.0	Square foot per pupil, a standard	...
CA	5.0	Cost allowance (as per NYS building aid formula and index)	...
AR1	.3	Aid ratio (as per NYS building aid formula) - in base year	...
CHAR	.3	Change in aid ratio, annual trend (as per NYS aid formula)	...
TR1	.6	Tax rate (of municipality or school district) in base year	...
CHTR1	.6	Change in tax rate, annual trend	...

*If neither the rated capacity nor square footage standards are known, try SFP = 100.

**Number of digits for variable on each side of decimal.

***Dots (...) signify that card may be placed anywhere but last in a given data run.

Column 1	6	Description of Item	Card Sequence
(Purchased Building Data)			
CB	9.0	Cost of found building, purchase price	...
CR	9.0	Cost of renovation of found building	...
CF2	9.0	Cost of fees (purchased building)	...
DSP	9.0	Debt service on purchased building (if bond is issued)	...
VP	9.0	Principal value of bond (consistent with above)	...
N2	3.0	Bond term, in years, (consistent with above)	...
RC2	6.0	Rated capacity (of purchased, converted building)	...
SFT2	9.0	Square footage (of purchased, converted building)	...
PAIDP	8.0	Total state aid on converted building when figured in a lump sum)	...
ATP	7.0	Annual property tax, in the base year (prior to ownership transfer)	...
TAVP	8.0	Assessed property value in the base year (as above)	...
L2	4.1	Purchased building expected life usefulness, in years	...
CAGE1P	.3	Operations and maintenance cost annual inflation factor	...
OMP	7.0	Annual operations and maintenance cost in first year of school operation	...
RESALP	9.0	Estimated resale value of building, subsequent to last year of expected use	...
(New School Building Data)			
CS	9.0	Cost of site	...
CC	9.0	Construction cost of new building	...
CF3	9.0	Cost of fees (related to the new building)	...
DSN	9.0	Debt service (if bond is issued), on new building	...
VN	9.0	Principal (value) of the bond (consistent with above)	...

Column 1	Column 6	Description of Item	Card Sequence
N3	3.0	Bond term, in years (consistent with above)	...
RC3	6.0	Rated capacity of the new school building	...
SFT3	9.0	Square footage of the new building	...
PAIDN	8.0	Total state aid on new building (when figured in a lump sum)	...
ATN	7.0	Annual property tax in the base year (prior to ownership transfer)	...
TAVN	8.0	Assessed property value in the base year (as above)	...
L3	4.1	New building expected life usefulness, in years	...
CAGE1N	.3	Operations and maintenance annual inflation factor	...
OMP	7.0	Annual operations and maintenance cost in first year of school operation	...
RESALN	9.0	Estimated resale value of building, subsequent to last year of expected use	...
(Leased Building Data)			
RENT	9.0	Annual rental payments	...
RAID	9.0	State aid for rented building, on annual basis	...
L1	4.1	Term of the lease, in years (expected life use of building)	...
RENO	9.0	Renovation costs (paid by the school district separate from RENT)	...
RY	9.0	Renovation year (year RENO performed, as measured from base year - i.e. RY can be zero)	...
RC1	6.0	Rated capacity of the leased building	...
SFT1	9.0	Square footage of the leased building	...
CAGE1R	.3	Operations and maintenance cost annual inflation factor	...
OMR	7.0	Annual operations and maintenance costs in first year of school operation (paid by the school district separate from RENT)	...
GO		Signals start of data run	After data for each run
STOP		Signals end of data runs	After last "GO"

Options and Other Notes on Program Computations

Certain operations can be computed in several ways depending on data availabilty. Options exist for the computation of rated capacity of the building (as noted above), state building aid reimbursement, and annual property tax.

- State aid reimbursement: The program will compute building aid by the New York State formula or the value of the aid based on projected building costs (or computed on some other basis) may be entered as a lump sum. CA, AR1, and CIAR, data arguments located in the so-called "general" category, apply only if state building aid is calculated by a formula like that employed in New York State. If any other calculation of reimbursements is used, values for these data items need not be entered. Alternatively, the total amount of reimbursement for purchased and new school buildings should be entered in PAIDP and PAIDN respectively.

Constant annual reimbursements for leased buildings, if any, are entered in RAID. (As presently written the program assumes that any aid for leased buildings is constant for the term of the lease.)

For purchased buildings (or hypothetically, new school buildings) in states with aid formulas like New York's, but which are not eligible for reimbursement, enter ".1" in PAIDP (or PAIDN for new schools). Stated differently, if AR1 is a value other than zero, but the purchased or new school alternative is ineligible for state aid, the appropriate PAID data item must be set at ".1."

- Annual Property Tax: If the annual property tax on a property prior to transfer of ownership of that property to the school board is known (ATP or ATN for purchased and new school buildings respectively) the assessed value of the property (TAVP and TAVN respectively for purchased and new) is irrelevant and may be set at zero. Conversely, if the base year property tax is not known the program will calculate it based on the assessed property value (TAVP, TAVN) and the base year municipal tax rate (TR1).

In addition, the data items TR1 and CHTR1 are used for projecting future year property taxes and computing the present value of this income lost to the school district. If TR1, however, is zero no property tax income lost will be calculated. (A zero value for TR1 causes a bypass of this computation.)

The ratio of CHTR1 to TR1 determines the annual rate of increase of the property tax loss. Therefore, if CHTR1 is not known but a projected rate of property tax increase is available, the values of these two data items can be set according to the ratio (CHTR1/TR1). If the property tax is expected to remain constant, then CHTR1 is zero.

Sensitivity Analysis

Because of the way the program is designed* it is a simple matter to test the sensitivity of the cost outcomes to slight variations in data value inputs. Only the single pertinent data item (or items) need be changed to rerun the program. Thus the testing of parameters such as the effect on long term costs of high, medium and low estimates or cost under alternative approaches of a particular variable can easily be performed.

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*See "Overall Design," and "Reuse of Data Values and Resetting Data Items," above.

COMPUTER PROGRAM

```
      DIMENSION DATA(50),CDATA(50),SNAME(5),DATE(4)
      REAL L1,L2,L3
      DATA (CDATA(I),I=1,50)/2HCB,2HCR,3HCF2,3HDSP,4HROIT,2HN2,
    & 2HVP,4HSFT2,3HSFP,3HRC2,2HCA,5HPAIDP,3HAR1,4HCHAR,
    & 3HTR1,4HTAVP,5HCHTR1,2HL2,6HCAGE1P,3HOMP,6HRESALP,2HCS,
    & 2HCC,3HCF3,3HDSN,2HN3,2HVN,4HSFT3,3HRC3,5HPAIDN
    & ,3HATN,4HTAVN,5HCAGE1N,3HOMN,2HL3,3HOMR,6HRESALN,
    & 3HATP,4HRENT,4HRAID,2HL1,4HREND,2HRY,4HSFT1,
    & 6HCAGE1R,3HRC1,5HPRINT,2HGD,4HNAME,4HSTOP/
      DO 198 I=1,46
198   DATA(I)=0.
200      READ(05,201)CODE,DATA1
201   FORMAT(A6,F15.5)
     DO 210 I=1,50
     IF(CODE.EQ.CDATA(I))GOTO220
210    CONTINUE
      WRITE (06,211)
211    FORMAT (12H NO SUCH PAR)
      GOTO200
220    IF(I.EQ.50)STOP
      IF(I.EQ.49)GOTO225
      IF(I.EQ.48)GOTO250
      IF(I.EQ.47)GOTO230
      DATA(I)=DATA1
      GOTO200
225  READ (05,227)(SNAME(J),J=1,5)
      READ (05,227)(DATE(I),I=1,4)
227   FORMAT(5A6)
     GOTO200
230   CALL PRTDAT(DATA)
      GOTO200
250    CB=DATA(1)
      CR=DATA(2)
      CF2=DATA(3)
      DSP=DATA(4)
      ROIT=DATA(5)
```

```
N2=DATA(6)
VP=DATA(7)
SFT2=DATA(8)
SFP=DATA(9)
RC2=DATA(10)
CA=DATA(11)
PAIDP=DATA(12)
AR1=DATA(13)
CHAR=DATA(14)
TR1=DATA(15)
TAVP=DATA(16)
CHTR1=DATA(17)
L2=DATA(18)
CAGE1P=DATA(19)
OMP=DATA(20)
RESALP=DATA(21)
CS=DATA(22)
CC=DATA(23)
CF3=DATA(24)
DSN=DATA(25)
N3=DATA(26)
VN=DATA(27)
SFT3=DATA(28)
RC3=DATA(29)
PAIDN=DATA(30)
ATN=DATA(31)
TAVN=DATA(32)
CAGE1N=DATA(33)
OMN=DATA(34)
L3=DATA(35)
OMR=DATA(36)
RESALN=DATA(37)
ATP=DATA(38)
RENT=DATA(39)
RAIC=DATA(40)
L1=DATA(41)
```

```
      RENO=DATA(42)
      RY=DATA(43)
      SFT1=DATA(44)
      CAGE1R=DATA(45)
      RC1=DATA(46)
     PSTP=0.
     PASP=0.
     PTXP=0.
     PSTN=0.
     PASN=0.
     PTXN=0.
      PUSP=0.
      PCMP=0.
      VCP=0.
      PESALP=0.
      PREP=0.
      CAPP=0.
      CASP=0.
      PUSN=0.
      PCMN=0.
      VCN=0.
      PESALN=0.
      PREN=0.
      CAPN=0.
      CASN=0.
      PRNT=0.
      PRUM=0.
      PRND=0.
      PRER=0.
      CAPR=0.
      CASR=0.
      IFLER=0
      IF(ROIT.NE.0.)GO TO 9
      IFLER=5
      GO TO 950
C
```

```
C       COSTS OF A PURCHASED FOUND SPACE BUILDING ARE CALCULATED
C
C       THE COST OF THE PURCHASE,RENOVATION AND FEES OF THE BUILDING ARE
C       SUMMED (CP).
  9     CP=CB+CR+CF2
        IF (CP.EQ.0.)GO TO 67
C      THE PRESENT VALUE (PDSP) OF THE SERIES OF ANNUAL DEBT SERVICE PAYMENTS
C      (DSP)--BASED ON CURRENT INFLATION RATES (ROIT)--IS FOUND.
 10     CALL PVAL(DSP,ROIT,N2,PDSP)
C       IF THE BOND VALUE (VP) IS LESS THAN THE TOTAL BUILDING COST (CP)
C       THE DIFFERENCE IS DETERMINED (VCP).
        VCP=CP-VP
C       STATE AID IS DETERMINED.  IF TOTAL STATE AID IS NOT GRANTED OUTRIGHT
C       (PAIDP), AND IF THIS FIGURE IS NOT KNOWN , ANNUAL STATE AID
C       REIMBURSEMENTS (STAIDP) ARE CALCULATED ACCORDING TO THE NEW YORK
C      STATE BUILDING AID FORMULA.  THE ANNUAL PAYMENTS, ADJUSTED BY PROJECTED
C       CHANGES IN THE SCHOOL DISTRICT AID RATIO (CHAR), ARE DISCOUNTED TO PRESEN
C       VALUE AND ACCUMULATED (PSTP AND PASP)FOR THE DURATION OF THE
C       PAYMENTS (N2YEARS).
        IF(RC2.NE.0.)GO TO 12
        IF(SFP.NE.0.)GO TO 11
        IFLER=9
        GO TO 950
 11     RC2=SFT2/SFP
 12     IF(PAIDP.NE.0.)GO TO 20
        AR=AR1
        ACQ=VCP
        CALL STATE(RC2,CA,ACQ,AR,CP,STAIDP)
        PSTP=STAIDP
        ACQ=DSP
        PASP=0.0
        IF(N2.LT.1)GOTO20
        DO 45 K=1,N2
        CALL STATE(RC2,CA,ACQ,AR,CP,STAIDP)
        CALL PWOR(STAIDP,ROIT,K,WAP)
        PASP=PASP+WAP
```

```
      AR=AR1+(FLOAT(K)*CHAR)
      IF(AR.LT.0.)GOTO20
 45   CONTINUE
C     PROPERTY TAXES (ATP), INCOME LOST TO THE SCHOOL DISTRICT ONCE THE
C     BUILDING IS CONVERTED TO A SCHOOL, ARE CALCULATED IF NOT KNOWN.  THE
C     ANNUAL TAX IS ADJUSTED ACCORDING TO PROJECTED CHANGES IN THE MUNICIPAL
C     TAX RATE (CHTR), DISCOUNTED TO PRESENT VALUE, AND ACCUMULATED(PTXP)
C     DURING THE PROJECTED LIFE USE OF THE BUILDING(L2).
 20   IF(ATP.NE.0.)GO TO 30
      TR=TR1
      CALL TAX(TR,TAVP,ATP)
 30   PTXP=ATP
      LL2=L2
      IF(LL2.LT.2)GOTO56
      IF(TR1.EQ.0.)GO TO 56
      DO 55 K=2,LL2
      YAP=ATP*(1.+FLOAT(K-1)*CHTR1/TR1)
      CALL PWOR(YAP,ROIT,K,WTP)
      PTXP=PTXP+WTP
 55     CONTINUE
C     ANNUAL OPERATIONS AND MAINTENANCE COSTS, BASED ON FIRST YEAR O AND M
C     COSTS (OMP), AND AN ANNUAL INCREASE FACTOR (CAGEP) ARE CALCULATED
C     (AOMP), DISCOUNTED TO PRESENT VALUE (WOP), AND TOTALED (POMP) FOR
C     THE EXPECTED LIFE USE OF THE BUILDING.
 56   POMP=OMP
      IF(LL2.LT.2)GOTO66
      DO 65 K=2,LL2
      CALL OPMAN(OMP,CAGE1P,K-1,AOMP)
      CALL PWOR(AOMP,ROIT,K,WOP)
      POMP=POMP+WOP
 65    CONTINUE
C     ANY ANTICIPATED INCOME FROM THE SALE OF     BUILDING IN SOME FUTURE
C     YEAR (RESALP) IS DISCOUNTED TO ITS PRESE    WORTH (PESALP).
 66   CALL PWOR(RESALP,ROIT,LL2,PESALP)
C     THE TOTAL PRESENT VALUE OF THE PURCHASED PROPERTY (PREP) TO THE SCHOOL
C     DISTRICT IS THE SUM OF THE PRESENT VALUES O  DEBT SERVICE(PDSP),INITIAL,
```

```
C        UNFINANCED CAPITAL OUTLAY (VCP), LOST PROPERTY TAX (PTXP), AND ANNUAL
C        OPERATIONS AND MAINTENANCE (POMP), MINUS STATE BUILDING AID (PAIDP,PSTP,
C        PASP) AND RESALE INCOME (PESALP).
         PREP=PDSP+VCP+PTXP+PUMP-PSTP-PASP-PESALP-PAIDP
C        THE AVERAGE ANNUAL PRESENT VALUE OF THE PURCHASED BUILDING PER PUPIL
C        (CAPP), BASED ON THE BUILDING'S RATED CAPACITY (RC2), AND PER SQUARE
C        FOOT (CASP), BASED ON THE TOTAL SQUARE FOOTAGE (SFT2) IS CALCULATED.
C        THE ANNUAL AVERAGE IS BASED ON THE EXPECTED USE LIFETIME OF THE
C        BUILDING (L2).
         IF(RC2.EQ.0.)IFLER=10
         IF(SFT2.EQ.0.)IFLER=8
         IF(L2.EQ.0.)IFLER=18
         IF(IFLER.NE.0)GO TO 950
         CAPP =(PREP/L2)/RC2
         CASP=(PREP/L2)/SFT2
C
C
C        COSTS OF A NEW SCHOOL BUILDING ARE CALCULATED.
C
C        THE COMPONENT COSTS OF THE NEW SCHOOL BUILDING (SITE, CONSTRUCTION,
C        RELOCATION/DEMOLITION, AND FEES) ARE SUMMED (CN).
 67      CN=CS+CC+CF3
         IF(CN.EQ.0.)GO TO 100
C     THE PRESENT VALUE (PDSN) OF THE SERIES OF ANNUAL DEBT SERVICE PAYMENTS
C       (DSN)--BASED ON CURRENT INFLATION RATES (ROIT)--IS FOUND.
 70      CALL PVAL(DSN,ROIT,N3,PDSN)
C        IF THE BOND VALUE (VN) IS LESS THAN THE TOTAL BUILDING COST (CN), THE
C        DIFFERENCEIS DETERMINED (VCN).
         VCN=CN-VN
C        STATE AID IS DETERMINED.  IF TOTAL STATE AID IS NOT GRANTED OUTRIGHT
C           (PAIDN), AND IF THIS FIGURE IS NOT KNOWN , ANNUAL STATE AID
C        REIMBURSEMENTS (STAIDN) ARE CALCULATED ACCORDING TO THE NEW YORK
C     STATE BUILDING AID FORMULA.  THE ANNUAL PAYMENTS, ADJUSTED BY PROJECTED
C        CHANGES IN THE SCHOOL DISTRICT AID RATIO (CHAR), ARE DISCOUNTED TO PRESEN
C      VALUE AND ACCUMULATED (PSTN AND PASP)FOR THE DURATION OF THE
C        PAYMENTS (N3YEARS).
```

```
      IF(RC3.NE.0.)GO TO 72
      IF(SFP.NE.0.)GO TO 71
      IFLER=9
      GO TO 950
71     RC3=SFT3/SFP
72    IF(PAIDN.NE.0.)GO TO 80
      AR=AR1
      ACQ=VCN
      CALL STATE(RC3,CA,ACQ,AR,CN,STAIDN)
      PSTN=STAIDN
      ACQ=DSN
      PASN=0.0
      IF(N3.LT.1)GOTO80
      DO 75 K=1,N3
      CALL STATE(RC3,CA,ACQ,AR,CN,STAIDN)
      CALL PWOR(STAIDN,ROIT,K,WAN)
      PASN=PASN+WAN
      AR=AR1+(FLOAT(K)*CHAR)
      IF(AR.LT.0.)GOTO80
75     CONTINUE
C     PROPERTY TAXES (ATN), INCOME LOST TO THE SCHOOL DISTRICT ONCE THE
C     BUILDING IS CONVERTED TO A SCHOOL, ARE CALCULATED IF NOT KNOWN.  THE
C     ANNUAL TAX IS ADJUSTED ACCORDING TO PROJECTED CHANGES IN THE MUNICIPAL
C     TAX RATE (CHTR), DISCOUNTED TO PRESENT VALUE, AND ACCUMULATED(PTXN)
C     DURING THE PROJECTED LIFE USE OF THE BUILDING(L3).
80      IF(ATN.NE.0.)GO TO 90
     CALL TAX(TR,TAVN,ATN)
90   PTXN=ATN
      LL3=L3
     IF(LL3.LT.2)GOTO86
      IF(TR1.EQ.0.)GO TO 86
     DO 85 K=2,LL3
     YAN=ATN*(1.+CHTR1/TR1*FLOAT(K-1))
     CALL PWOR(YAN,ROIT,K,WTN)
     PTXN=PTXN+WTN
85     CONTINUE
```

```
C       ANNUAL OPERATIONS AND MAINTENANCE COSTS, BASED ON FIRST YEAR O AND M
C       COSTS (OMN), AND AN ANNUAL INCREASE FACTOR (CAGEN) ARE CALCULATED
C       (AOMN), DISCOUNTED TO PRESENT VALUE (WOMN) AND TOTALLED (POMN) FOR
C       THE EXPECTED LIFE USE OF THE BUILDING (L3).
 86     POMN=OMN
        IF(LL3.LT.2)GOTO96
        DO 95 K=2,LL3
        CALL OPMAN(OMN,CAGEIN,K-1,AOMN)
        CALL PWOR(AOMN,ROIT,K,WOMN)
        POMN=POMN+WOMN
 95      CONTINUE
C       ANY ANTICIPATED INCOME FROM THE SALE OF THE BUILDING IN SOME FUTURE
C       YEAR (RESALP) IS DISCOUNTED TO ITS PRESENT WORTH (PESALP).
 96     CALL PWOR(RESALN,ROIT,LL3,PESALN)
C       THE TOTAL PRESENT VALUE OF THE NEW SCHOOL BUILDING(PREN) TO THE SCHOOL
C       DISTRICT IS THE SUM OF THE PRESENT VALUES OF DEBT SERVICE (PDSP),
C       INITIAL, UNFINANCED CAPITAL OUTLAY (VCP), LOST PROPERTY TAXES (PTXP)
C       AND ANNUAL OPERATIONS AND MAINTENANCE (POMP), MINUS STATE BUILDING AID
C       (PAIDP, PSTP, PASP) AND RESALE INCOME (PESALP).
        PREN=PDSN+VCN+PTXN+POMN-PSTN-PASN-PAIDN-PESALN
C       THE AVERAGE ANNUAL PRESENT VALUE OF THE NEW SCHOOL BUILDING PER PUPIL
C       (CAPN), BASED ON THE BUILDING'S RATED CAPACITY (RC3), AND PER SQUARE
C       FOOT (CASN) BASED ON THE TOTAL SQUARE FOOTAGE (SFT3), IS CALCULATED.
C       THE ANNUAL AVERAGE IS BASED ON THE EXPECTED USE LIFETIME OF THE
C       BUILDING (L3).
        IF(L3.EQ.0.)IFLER=35
        IF(RC3.EQ.0.)IFLER=29
        IF(SFT3.EQ.0.)IFLER=28
        IF(IFLER.NE.0)GO TO 950
        CAPN=(PREN/L3)/RC3
        CASN=(PREN/L3)/SFT3
C
C
C       COSTS OF A LEASED FOUND SPACE BUILDING ARE CALCULATED
C
C       MOST LEASES BETWEEN BOARDS OF EDUCATION AND PROPERTY OWNERS NOW PROVIDE
```

```
C       THAT ANY INCREASE IN PROPERTY TAXES DURING THE TERM OF THE LEASE WILL
C       BE PAID BY THE TENANT.  SINCE THE SCHOOL DISTRICT, DIRECTLY OR
C       INDIRECTLY,IS THE RECIPIENT OF PROPERTY TAXES, THE EFFECTIVE DOLLAR
C       DIFFERENCE BETWEEN RENTAL PAYMENTS (RENT) AND PROPERTY TAXES (ATR) ON A
C       GIVEN BUILDING WILL REMAIN THE SAME REGARDLESS OF TAX INCREASES.  THE
C      EFFECTIVE COST OF ANNUAL LEASE PAYMENTS BY A SCHOOL DISTRICT MAY ALSO BE
C       REDUCED BY STATE AID (RAID) -- IN SOME CASES.  THUS,
C       ANNUAL RENTAL PAYMENTS ARE DETERMINED
C       (ACTR) AND PRESENT VALUE OF THE SERIES OF RENTAL PAYMENTS FOR THE LENGTH
C       OF THE LEASE (L1) IS CALCULATED (PRNT).
 100    ACTR=RENT-RAID
        IF(RAID.NE.C.)GO TO 101
        IF (ACTR.EQ.0.)GO TO 899
 101    LL1=L1
        CALL PVAL(ACTR,ROIT,LL1,PRNT)
C       ANY EXPENDITURE FOR RENOVATION (RENO) PAID FOR BY THE SCHOOL DISTRICT,
C       NOT THROUGH RENTAL PAYMENTS, IN A FUTURE (OR PRESENT) YEAR (RY) IS
C       DISCOUNTED TO ITS PRESENT WORTH (PRND).
        IRY=RY
        CALL PWOR(RENO,ROIT,IRY,PRND)
C       THE RATED PUPIL CAPACITY (RC1) OF THE LEASED BUILDING IS CALCULATED.
        IF (RC1.NE.0.)GO TO 102
        IF(SFP.NE.0.)GO TO 103
        IFLER=9
        GO TO 950
 103    RC1=SFT1/SFP
C       ANNUAL OPERATIONS AND MAINTENANCE COSTS, BASED ON FIRST YEAR O AND M
C       COSTS (OMR), AND AN ANNUAL INCREASE FACTOR (CAGER) ARE CALCULATED
C       (AOMR), DISCOUNTED TO PRESENT VALUE (WOR) AND TOTALLED (POMR) FOR
C       THE TERM OF THE BUILDING LEASE (L1).
 102    PROM=OMR
        IF(LL1.LT.2)GOTO126
        DO 125 K=2,LL1
        CALL OPMAN(OMR,CAGE1R,K-1,AOMR)
        CALL PWOR(AOMR,ROIT,K,WOR)
        PROM=PROM+WOR
```

```
 125     CONTINUE
C       THE TOTAL PRESENT VALUE OF THE LEASED BUILDING (PRER) TO THE SCHOOL
C       DISTRICT IS THE SUM OF THE PRESENT VALUES OF THE ADJUSTED RENT (PRNT),
C       RENOVATION EXPENDITURES (PRND) AND ANNUAL O AND M COSTS (PROM).
 126    PRER=PRNT+PRND+PROM
C       THE AVERAGE ANNUAL PRESENT VALUE OF THE LEASED PROPERTY PER PUPIL (CAPR)
C       BASED ON THE BUILDING'S RATED CAPACITY (RC1), AND PER SQUARE FOOT(CASR),
C       BASED ON THE TOTAL SQUARE FOOTAGE (SFT1), IS CALCULATED.  THE ANNUAL
C       AVERAGE IS BASED ON THE LENGTH OF THE LEASE IN YEARS (L1),
        IF(L1.EQ.0.)IFLER=41
        IF(RC1.EQ.0.)IFLER=46
        IF(SFT1.EQ.0.)IFLER=44
        IF(IFLER.NE.0)GO TO 950
        CAPR=(PRER/L1)/RC1
        CASR=(PRER/L1)/SFT1
 899    WRITE (06,900)(SNAME(J),J=1,5),(DATE(J),J=1,4)
 900    FORMAT (13H1SCHOOL NAME:,3X,5A6,3X,5HDATE:,4A6)
        WRITE (06,901)
       CALL PRTDAT(DATA)
        WRITE(06,901)
        WRITE(06,898)
 898    FORMAT(1H0,37X,7HRESULTS)
 901    FORMAT(1H0)
        WRITE (06,920)
 920    FORMAT (1H035X,11HLEASED BLDG,3X,14HPURCHASED BLDG,3X,
     &  10HNEW SCHOOL)
        WRITE (06,902)CP,CN
 902    FORMAT(19H0TOTAL CAPITAL COST,33X,F9.0,6X,F9.0)
        WRITE (06,903)ACTR
 903     FORMAT(18H FIRST YEAR RENTAL,19X,F9.0)
        WRITE (06,904)
 904     FORMAT(15H0PRESENT VALUES)
        WRITE (06,905)PRNT,PDSP,PDSN
 905     FORMAT(23H     DEBT SERVICE/RENTAL,14X,F9.0,6X,F9.0,6X,F9.0)
        WRITE (06,906)VCP,VCN
 906    FORMAT(29H     FIRST YEAR CAPITAL OUTLAY,17X,2(6X,F9.0))
```

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```
      WRITE (06,907)PRND
907   FORMAT(25H   . LEASE RENOVATION CO T,12X,F9.0)
      WRITE (06,908)PTXP,PTXN
908    .RMAT(7H    TAX,45X,F9.0,6X,F9.0)
      WRITE (06,909)PRUM,PUMP,PUMN
909   FORMAT(28H    UPERATIONS & MAINTENANCE,3X,3(6X,F9.0))
      WRITE (06,910)PAIDP,PAIDN
910   FORMAT(14H    STATE AID',38X,F9.0,6X,F9.0)
      WRITE (06,911)PSTP,PSTN
911   FORMAT(35H       FOR FIRST YEAR CAPITAL OUTLAY,11X,2(6X,F9.0))
      WRITE (06,912)PASP,PASN
912   FORMAT(23H       FOR ANNUAL SUMMED,23X,2(6X,F9.0))
      WRITE (06,913)PESALP,PESALN
913    FORMAT(10H    RESALE,36X,2(6X,F9.0))
      WRITE (06,914)PPER,PREP,PREN
914   FORMAT(22H0TOTAL (PRESENT VALUE),9X,3(6X,F9.0))
     WRITE (06,915)L1,L2,L3
915     FORMAT(18H0EXPECTED LIFETIME,14X,3(5X,F10.1))
     WRITE (06,916)CAPR,CAPP,CAPN
916   FORMAT(23H0ANNUAL VALUE PER PUPIL,10X,3(4X,F11.2))
     WRITE (06,917)CASR,CASP,CASN
917   FORMAT(29H ANNUAL VALUE PER SQUARE FOOT,4X,3(4X,F11.2))
       WRITE (06,901)
       WRITE (06,901)
      GOTO200
950   WRITE(06,900)(SNAME(J),J=1,5),(DATE(J),J=1,4)
      WRITE(06,901)
      CALL PRTDAT(DAT^^
      WRITE(06,901)
      WRITE(06,951) CDATA(IFLER)
951   FORMAT(25H1ILLEGAL ZERO IN VARIABLE,A6)
      GO TO 200
     END
      SUBROUTINE PRTDAT(DATA)
      DIMENSION DATA(2)
      WRITE (05,800)
```

```
      WRITE (06,801)
      WRITE (C6,802)DATA(11),DATA(39),DATA(1),DATA(22)
      WRITE (06,803)DATA(13),DATA(40),DATA(2),DATA(23)
      WRITE (06,804)DATA(14),DATA(42),DATA(3),DATA(24)
      WRITE (06,805)DATA(15),DATA(43),DATA(6),DATA(26)
      WRITE (06,806)DATA(17),DATA(7),DATA(27)
      WRITE (06,807)DATA(4),DATA(25)
      WRITE (06,808)DATA(9),DATA(44),DATA(8),DATA(28)
      WRITE (06,809)DATA(5),DATA(46),DATA(10),DATA(29)
      WRITE (06,810)DATA(41),DATA(18),DATA(35)
      WRITE (06,811)DATA(12),DATA(30)
      WRITE (06,812)DATA(38),DATA(31)
      WRITE (06,813)DATA(16),DATA(32)
      WRITE (06,814)DATA(45),DATA(19),DATA(33)
      WRITE (06,815)DATA(36),DATA(20),DATA(34)
      WRITE (06,816)DATA(21),DATA(37)
     RETURN
800   FORMAT(1H038X,4HDATA)
801   FORMAT(8H0GENERAL,12X,12HLEASED BLDG.,7X,15HPURCHASED BLDG.,
    & 4X,16HNEW SCHOOL BLDG.)
802   FORMAT(4H CA=,7X,F5.0,4X,6HRENT= ,F9.0,4X,
    & 3HCB=,5X,F9.0,2X,3HCS=,5X,F9.0)
803   FORMAT(5H AR1=,6X,F5.3,4X,6HRAID= ,F9.0,4X,
    & 3HCR=,5X,F9.0,2X,3HCC=,5X,F9.0)
804   FORMAT(6H CHAR=,4X,F6.3,4X,6HREND= ,F9.0,4X,
    & 4HCF2=,4X,F9.0,2X,4HCF3=,4X,F9.0)
805   FORMAT(5H TR1=,3X,F8.6,4X,6HRY=    ,F9.0,4X
    & 3HN2=,5X,F9.0,2X,3HN3=,5X,F9.0)
806   FORMAT(8H CHTR1= ,F8.6,23X,3HVP=,5X,F9.0,2X,3HVN=,5X,F9.0)
807   FORMAT(1H 38X,4HDSP=,4X,F9.0,2X,4HDSN=,4X,F9.0)
808   FORMAT(5H SFP=,7X,F4.0,4X,6HSFT1= ,F9.0,4X,
    & 5HSFT2=,3X,F9.0,2X,5HSFT3=,3X,F9.0)
809   FORMAT(6H RCIT=,5X,F5.3,4X,6HRC1=   ,F9.0,4X,
    & 4HRC2=,7X,F6.0,2X,4HRC3=,7X,F6.0)
810   FORMAT(1H 19X,6HL1=    ,F9.1,4X,3HL2=,10X,F4.1,2X,3HL3=,10X,F4.1)
811   FORMAT(1H 38X,6HPAIDP=,3X,F8.0,2X,6HPAIDN=,3X,F8.0)
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812   FORMAT(1H 38X,4HATP=,6X,F7.0,2X,4HATN=,6X,F7.0)
813   FORMAT(1H 38X,5HTAVP=,4X,F8.0,2X,5HTAVN=,4X,F8.0)
814   FORMAT(1H 19X,7HCAGE1R=,3X,F5.3,4X,7HCAGE1P=,5X,F5.3,
    & 2X,7HCAGE1N=,5X,F5.3)
815   FORMAT(1H 19X,6HOMR=  ,F9.0,4X,4HOMP=,6X,F7.0,2X,4HOMN=,6X,F7.0)
816   FORMAT(1H 38X,8HRESALP= ,F9.0,2X,8HRESALN= ,F9.0)
      END
      SUBROUTINE PVAL(ANN,ROIT,N,PRES)
C      PVAL IS A SUBROUTINE TO CALCULATE THE PRESENT VALUE --PRES-- OF A
C      SERIES OF FUTURE (USUALLY ANNUAL) EXPENDITURES --ANN-- IF THE
C      NUMBER OF EXPENDITURES --N-- AND THE INTEREST RATE --ROIT-- ARE KNOWN.
      Y=(1.+ROIT)**N
      X=1./Y
      PRES=ANN*((1.-X)/ROIT)
      RETURN
      END
      SUBROUTINE STATE(RC,CA,ACQ,AR,C,STAID)
C      STATE IS A SUBROUTINE FOR CALCULATING STATE BUILDING AID
C      ACCORDING TO THE FORMULA EMPLOYED IN NEW YORK STATE.
C      THE RATED CAPACITY OF THE BUILDING    --RC-- IS DETERMINED BY
C      THE TOTAL SQUARE FOOTAGE OF THE BUILDING DIVIDED BY A FIXED
C     STANDARD AREA PER PUPIL (SFT/SFP).
       W1=RC*CA/C
       IF(W1.GT.1.)W1=1.
       W=AR*W1
C      THE PORTION OF THE ABOVE FORMULA --(RC*CA)/C -- REPRESENTS THE
C      RATIO OF APPROVED BUILDING COST TO TOTAL BUILDING COST, A RATIO
C      WHICH REMAINS FIXED THROUGHOUT THE FINANCING OF A SCHOOL BUILDING.
C      AR REPRESENTS THE SCHOOL DISTRICTS AID RATIO, A RATIO WHICH IS
C      INDEPENDENT OF SCHOOL BUILDING COSTS, BUT CHANGES ANNUALLY.
      STAID=W*ACQ
      RETURN
      END
      SUBROUTINE PWOR(SUM,ROIT,N,WAR)
C      PWOR STANDS FOR PRESENT WORTH (OF A FUTURE EXPENDITURE); THAT IS,
C     THE PRESENT DISCOUNTED VALUE --WAR-- OF A PAYMENT --SUM-- MADE IN
```

```
C     A FUTURE YEAR --Y-- IF THE INTEREST RATE IS ROIT.
      WAR=SUM/((1.+ROIT)**N)
      RETURN
      END
      SUBROUTINE TAX(TR,TAV,AT)
C      TAX IS A SUBROUTINE FOR CALCULATING THE ANNUAL TAX --AT-- ON
C      PROPERTY IF THE ASSESSED VALUE OF THE PROPERTY --TAV-- AND THE
C      MUNICIPAL TAX RATE --TR-- ARE KNOWN.
      AT=TR*TAV
      RETURN
      END
      SUBROUTINE OPMAN(OM,CAGE,N,AOM)
C      OPMAN IS A SUBROUTINE FOR CALCULATING THE ANNUAL OPERATIONS AND
C      MAINTENANCE COST OF A BUILDING IN A FUTURE YEAR  --AOM-- IF THE
C     O AND M COST IN A BASE YEAR --OM-- IS KNOWN.  IT ASSUMES THAT
C      ANNUAL O +  M COST INCREASES ARE A FUNCTION OF THE PREVAILING
C      INFLATION RATE (WHICH AFFECTS LABOR AND MATERIALS)
C      AND THE AGE OF THE PARTICULAR BUILDING.  THE ASSUMED VALUE OF
C      CAGE IS DETERMINED EMPIRICALLY.
      AOM=OM*(1.+CAGE)**N
      RETURN
      END
```

SAMPLE OUTPUT

SCHOOL NAME: NEWTOWN HS/ROWLAWAY DATE:FEB 1973/OCT 1971

DATA

GENERAL		LEASED BLDG.		PURCHASED BLDG.		NEW SCHOOL BLDG.	
CA=	3625.	RENT=	365750.	CB=	1000000.	CS=	464000.
AR1=	0.253	RAID=	0.	CR=	1900000.	CC=	3878000.
CHAR=	-0.016	RENO=	0.	CF2=	95000.	CF3=	240000.
TR1=	0.060000	RY=	0.	N2=	14.	N3=	14.
CHTR1=	0.003196			VP=	1995000.	VN=	4582000.
				DSP=	213271.	DSN=	487381.
SFP=	101.	SFT1=	63000.	SFT2=	63000.	SFT3=	85850.
ROIT=	0.060	RC1=	850.	RC2=	850.	RC3=	850.
		L1=	10.0	L2=	25.0	L3=	45.0
				PAIDP=	0.	PAIDN=	0.
				ATP=	45000.	ATN=	45000.
				TAVP=	0.	TAVN=	0.
		CAGE1R=	0.100	CAGE1P=	0.100	CAGE1N=	0.100
		OMR=	51000.	OMP=	51000.	OMN=	91860.
				RESALP=	0.	RESALN=	0.

RESULTS

	LEASED BLDG	PURCHASED BLDG	NEW SCHOOL
TOTAL CAPITAL COST		2995000.	4582000.
FIRST YEAR RENTAL	365750.		
PRESENT VALUES			
DEBT SERVICE/RENTAL	2691952.	1982351.	4530199.
FIRST YEAR CAPITAL OUTLAY		1000000.	0.
LEASE RENOVATION COST	0.		
TAX		855786.	1184913.
OPERATIONS & MAINTENANCE	574510.	1946588.	9869813.
STATE AID:		0.	0.
FOR FIRST YEAR CAPITAL OUTLAY		0.	0.
FOR ANNUAL SUMMED		0.	499562.
RESALE		0.	0.
TOTAL (PRESENT VALUE)	3266462.	5784724.	15085363.
EXPECTED LIFETIME	10.0	25.0	45.0
ANNUAL VALUE PER PUPIL	384.29	272.22	394.39
ANNUAL VALUE PER SQUARE FOOT	5.18	3.67	3.90

APPENDIX E

PROCEDURES AND AGENCIES INVOLVED IN RENTING AND PURCHASING FOUND SPACE IN NEW YORK CITY

Once a found building has been identified by the Board of Education or a Community School District, the process of conversion involves several City Departments and Offices. It is a very lengthy and time-consuming process entailing the scheduling of dates, political maneuvering, performance of tasks and approvals by each agency. There are also roles and requirements of interested private parties - the owner and his agents.

The principal agencies are as follows:

- The School Planning and Research Division of the Board of Education (SPRD), which more than any other agency, is responsible for overseeing and generally supervising all found space projects -lease or purchase. SPRD is specifically responsible for educational facilities planning including assessment of enrollment needs and the determination of facility aspects of educational programs. Projects may be initiated by the SPRD or, more commonly, by official requests from community school boards.

- The Office of School Buildings of the Board of Education (OSB), which handles the construction, cost, maintenance, and other technical aspects of all school buildings. OSB provides technical evaluations and conversion cost estimates of prospective found buildings, and is equipped to draft plans, write specifications, review bids, award contracts, supervise construction, or perform with its own shop workers maintenance, repair, remodeling, and other construction work of small scope. These services are sometimes provided for found space projects, depending upon the circumstances.

- The Chancellor and Central Board of Education, the chief executive officer, and the five-member policy board. The policy board . must officially approve any found space proposal.

- The Department of Real Estate, which appraises the value of found buildings and negotiates the lease or purchase cost of buildings.

- The Site Selection Board, composed of representatives of the Controller's Office, the Bureau of the Budget, the City Planning Commission, the Department of Real Estate, the Borough President's Offices, and, as a non-voting member, the Board of Education. The working committee of the Site Selection Board fully evaluates all aspects of property considered for purchase prior to a decision on approval by the Site Selection Board.

- The Board of Estimate, on which sit, by virtue of their office, the highest city officials including the Mayor, the Controller, the City Council President, and the five Borough Presidents. The Board of Estimate is, in effect, the trustee board for all city funds and property and therefore is the final authority which must approve any transaction, including the lease of found buildings or capital budget lines for purchased buildings.
- Community School Boards, (CSB) of which there are 31 in New York City, the local trustee and policy bodies for the public elementary and middle schools. The CSBs, more than any other office or agency, the client/recipient of found space projects, most commonly initiate such projects, and participate in and approve planning, usually in a perfunctory, pro forma manner.

Accompanying these brief descriptions of the roles of the various agencies, a few comments may help clarify the time-consuming aspects of the three different procedures for acquiring space.

The initial steps under each procedure are basically as follows (with modifications pertinent to each procedure):

1. An official request is submitted to the SPRD of the Board of Education, usually by a CSB.
2. SPRD verifies the need; someone from its architectural division makes an initial inspection of the building giving attention to conditions and compliance with code and education requirements.
3. SPRD prepares architectural sketches, a tentative physical layout; OSB makes a more thorough technical inspection of building for necessary alterations and prepares cost estimates.
4. All data, technical memorandae, etc. are sent to the Department of Real Estate, which undertakes negotiations with the owner.
5. A resolution incorporating the terms of the negotiated agreement is prepared and voted on by the Board of Education.

At this point procedures for lease and purchase begin to vary. In the case of leases:

6. A resolution is prepared for adoption by the Board of Estimate.
7. Transaction papers (lease or purchase) are drawn up and signed.
8. Renovations begin and/or possession is taken. (Depending on circumstances the order of these steps may be reversed.)

In the case of purchases:

6. The materials are forwarded to the Site Selection Board's Working Committee for complete review and evaluation, and if found satisfactory, are recommended for Site Selection Board approval. In the case of purchases, Department of Real Estate negotiations would

proceed simultaneously and, if necessary, subsequently to Site Selection Board approval.

7. Running simultaneous to, but separate from this process, is the annual capital budget process. Funds for capital projects are authorized by capital budget lines. Under the revised system a single budget line permits the expenditure of funds for any building which meets certain criteria. The Board of Estimate approval is the final stage in the acceptance of an annual capital budget.

8. The design process begins subsequent to site selection approval. The design process consists of three steps - the scope (or program requirements), preliminary drawings, and final working drawings - each of which requires the approval of the Bureau of the Budget.

9. Transaction papers are drawn up and signed. A "Mayor's Certificate" (the Mayor's signature) is required here.

10. Possession is taken and renovation begins. (Condemnation proceedings begin if necessary.)

APPENDIX F

HEALTH, SAFETY AND BUILDING CODE CONSIDERATIONS

The codes tend to be complicated, sometimes contradictory, and highly detailed. Minimum requirements on dimensions, materials, and numbers, including variations and interrelationships with other factors for just about everything (like doors, stairways, temperature, and lighting) are specified. Though by no means a substitute for a qualified architect and a careful examination of pertinent codes, the following items attempt to summarize typical code provisions which are particularly applicable to conversion of existing buildings to schools.

Construction Type or Classification

The combustibility of the materials of which the building is constructed determine its fire rating or construction class. Higher-class - more nearly fireproof - buildings, obviously considered safer, are also more flexible with regard to other fire considerations: building height, occupancy level, necessity of sprinkler systems, and the like. For educational uses, as a general rule, higher-class buildings are preferable.

Exits

At a minumum two remote means of egress to the outside are required for most buildings of any type. In the case of places of assembly and schools, particularly under newer codes, regulations tend to become more strict. Fire escapes, for example,

are rarely accepted as a secondary means of egress under new codes. Exterior doors must open outward and must usually be equipped with panic-type hardware. The location, number, and dimensions of exits is a function of the building size (basically the area on any typical floor), the building usage, the number of occupants, and the maximum travel distance from any point within the building.

Stairways

Stairways in educational spaces must usually be self-supporting, enclosed with fire-resistive materials, and lead to an exit to the outside. Stairway dimensions (width, step rise, tread depth, and occupant load capacities are sometimes specified (as they are in the NYSMPS. As new stairway towers are an expensive construction item, it is often advisable to search for buildings in which exit considerations are not a problem.

Interior Spaces: Classroom and Places of Assembly

The use, occupancy, and size of an interior space will determine its classification and its requirements with regard to other building factors. Places of assembly, for example, require two remote means of egress to a separate smoke zone; classrooms often require only one means of egress, sometimes two, and sometimes one primary means of egress and one secondary (e.g., a ground level window). The square footage per occupant and the live load capacity of the structure normally will also vary depending on the space classification. In New York City, for example, under the new code, 20 square feet per occupant is required for classroom use and only 10 square feet per

occupant in a place of assembly. However, a concentrated live load of 60 pounds per square foot (psf) is required for places of assembly and only 40 psf is required for classrooms. In converting non-school buildings such factors can influence educational program decisions.

Occupancy by more than a certain number of people (frequently 75) and/or an area over a certain size (which depending on code, may vary from 500 to 1500 square feet) are factors which will define a space as a place of assembly as opposed to a classroom.

The requirements regarding travel distance to exits or corridors also vary with two different space classifications (for example, not more than 50 feet to a corridor from a classroom; and not more than 75 feet - 90 feet in Philadelphia - in a place of assembly). This factor places an effective limit on the size of interior spaces and the proportions of buildings which may be used.

Undivided Interior Areas

In addition to the distance to exit requirement mentioned just above, the total undivided interior area is limited by provisions calling for fire and smoke zones. The maximum size of an area undivided by fire walls and smoke separations is related to the building construction class, number of stories and the presence of sprinklers (varying from 5000 to over 30,000 square feet). Regarding found space conversion for schools these factors are likely to be pertinent only if large, older industrial loft or office buildings are being considered.

Corridors

Corridors must lead to exits or separate smoke zones. Blind corridors - which may be defined dimensionally, the depth as a ratio of the width - are prohibited. The clear width of a corridor is also specified, a function of the number of pupils it serves. (For example, in New York State primary corridors serving over 150 pupils must have a clear width of 8 feet; secondary corridors, serving under 150 pupils, must be only 6 feet wide.)

Live Load Capacity

The live load requirement, or structural bearing capacity of the floors varies for different buildings and uses, as mentioned above (see "Interior Spaces"). In converting found buildings, the existing live load can be an important consideration, especially if extensive renovations are involved: for the addition of heavy classroom walls or furniture or machinery will reduce the remaining live load.[1]

Basements

Basements entirely below ground generally may not be used. The use of basements which are only partly below grade

[1] The conversion of the South Boston High School Annex in the "L" Street bathhouse is a case in point. One wing of the building was left as an open space area with flexible, lightweight accordian partitions. The structure there could not support heavier classroom partition walls as were employed throughout the rest of the building.

The conversion of the Newtown H.S. Annex is another example. For more information on this converted school see the case study in appendix H.

generally is permitted. (In New York City, for example, spaces three feet below grade may be used.) In addition, a two-hour fire rating is required for the floor between the basement and the first floor.

Ceiling Heights

Ceiling heights may not be less than nine feet for normal instructional purposes, according to the NYSMPS.

Classroom Size and Proportions

The minimum area of a classroom is frequently determined by multiplying the intended pupil occupancy by a square footage per pupil figure (which depending on age level and code may vary from 10 to 35 feet). In addition, the NYSMPS recommends for classroom proportions that the short side be not less than two-thirds of the longer side.

Windows

In most places windows are required in educational facilities. They are not required for schools in New York City. Typical formulas for the amount of window surface are based on a minimum percentage of the interior floor area. (In Massachusetts, for example, the window area must equal 6 percent or more of the interior floor area for all elementary level instructional spaces. For secondary education the 6 percent requirement also applies but only 50 percent of the instructional rooms must fulfill it. In other places the window area requirement is 10 percent.) The New York State requirement does not follow the typical formula but achieves the same end

by specifying minimum heights for window sills and heads, window separations, and maximum interior distances from windowed walls. Codes in most places also provide that a certain percentage (e.g., 50 percent) of the windows be operable.

The NYSMPS justifies the window requirement in order to enable "substantial change in eye focusing distance."[1] In other places the argument appears to be based on the desire for natural ventilation. Regardless, the window requirement appears to be one of the most problematic building factors in the conversion of many found buildings.

Lighting

Code requirements for lighting prescribe minimum, maintained illumination levels, as measured in foot candles, (FCs), for different tasks and/or locations. (The minimum requirement for typical instructional areas ranges from 20 to 60 FCs.) While the NYSMPS and other codes recognize that the regulation of glare and differences in brightness (contrast) are as important as light intensity for visual comfort, guidelines on brightness ratios and glare are usually recommendations rather than requirements.

Heating

Codes generally require that heating systems be designed to maintain a given interior temperature (e.g., 68^{o} to 72^{o} for sedentary activities) when exterior temperatures are cold. For different activity areas (like gymnasiums and locker rooms)

[1]NYSMPS, p. 32.

different maintained temperature levels may be required.

Boiler Rooms and Mechanical Equipment

Many code provisions regarding heating systems apply to the mechanical aspects, specifying, for example, that boiler rooms be enclosed, or that only low pressure boilers be used within school buildings, etc. The provisions are numerous and the assistance of a mechanical engineer should be sought.

Ventilation

Typical code provisions will require mechanical ventilation capable of providing a minimum volume of outside air. The particular air circulation requirements are a factor based on the number of occupants and vary depending on outside temperatures. (For example, in New York State a minimum of 10 cubic feet per minute [cfm] per occupant of outside air must be provided when the outside temperature is 35° or above. The volume of air is reduced for lower outside temperatures.)

Toilets

Separate toilet facilities are required for boys and girls. The minimum ratios of water closets, urinals, and basins to pupils varies for the separate sexes and for different age levels, with a smaller ratio of toilet facilities required for older children. (A ratio of one toilet fixture to every 30 or 45 pupils would be typical. A higher ratio - like 1 fixture to every 15 children - prevails for very young children.) In addition, it is frequently required that toilet facilities be connected to kindergarten and early childhood

classrooms.

The number of toilet fixtures in most found buildings will be insufficient to meet the standards required for school use and occupancy levels. If there is sufficient space, however, the addition of toilet fixtures is rarely a major problem.

Sprinklers

Sprinkler systems will improve the fire rating of the building (thereby increasing the flexibility of the building's use with respect to factors like occupancy levels, exit requirements, etc.), and in some cases are required outright. (In Philadelphia, for example, buildings over a certain minimum size regardless of construction classification must have sprinklers.) The existence, therefore of sprinkler systems in found buildings may be viewed as an advantage.

Automatic Fire Alarms and Protections

Interior fire alarms are required for virtually all education facilities. In New York City, for school buildings exceeding certain minimum sizes, an alarm line connected to the fire station is also required. Smoke detectors, heat-sensing devices, and smoke vents are often recommended if not required by codes.

Fire Retardant Materials

Besides construction materials there is great concern about the fire-retardant characteristics of various materials used throughout schools: draperies, carpets, paints, wallpapers, floor coverings, and finishes of all types may all be

potentially flammable. As research on fire-resistive and fire-spread characteristics of various materials yields quantitative conclusions, more recommendations, and then requirements, are being added to the codes.

Service-System Connections

Sewage treatment facilities and water supplies must meet code requirements. Except for very remote rural areas it is generally required that these be tied into municipal systems. Otherwise, water supply wells and/or septic tanks and leaching fields must conform to current environmental standards.

Facilities for the Physically Handicapped

Cognizance of the needs of the physically handicapped have increased considerably in recent years. In fact, in 1973, the New York City Building Construction Code and the NYSMPS added sections of new provisions with requirements regarding walks, ramps, elevators, toilet facilities, parking spaces, door hardware, telephones and other items specifically for the handicapped in new buildings. Increasingly it may be anticipated that many of these requirements will be applied to older buildings and modernizations as well.

APPENDIX G

BUILDING TYPE SHEETS

Loft Buildings

Summary of Considerations

Old loft buildings used for industrial and storage purposes have frequently become available, particularly in older urban areas. The availability of this building type is as much a function of larger market factors affecting land use economics (such as result in migrations to suburbs) and rises and declines in whole industries, as it relates to the characteristics of the building itself. Such buildings are particularly well suited for occupational and industrial education programs where it is important to duplicate the trade siutation. Conventional school buildings and classrooms with many bearing walls, buried wiring, plumbing and ductwork (in floors and walls), and moderate electric services cannot really meet minimum needs for open space, heavy electrical power, and special equipment required by such programs.

The adequacy of loft buildings for academic and conventional instructional programs is potentially more problematic. As is true for many found buildings, open space and/or parking around multi-story loft buildings is often at a premium. Furthermore, such buildings are frequently located in industrial zones where educational programs generally are prohibited. Still, depending on the circumstances, it may be both feasible and desirable to obtain a zoning variance.

The advantages inherent in loft buildings - their basic structural solidity and open space flexibility - will not generally be affected by deterioration, age, or use. Other features of loft buildings are more ambiguous. Some of the systems, like plumbing and heating, will suffer from age and use and may not have been originally designed to meet modern standards or the requirements of school children. High ceilings, however, will facilitate the correction of such conditions while still allowing room for a dropped ceiling.

Structurally, the most important factors affecting circulation and spatial planning in the conversion of loft buildings are the multi-stories, in which the existence of freight elevators is a mixed blessing - they are expensive to convert to passenger use but heavily relied upon for vertical circulation; the practically indelible grid pattern established by the columns which interfere with creation of play areas and large group congregation spaces and which inhibit design freedom generally; and the broad expanses of open floor area - the centers of which, depending on fenestration requirements, may be difficult to utilize efficiently.

The re-use characteristics of many other features of these buildings may be expected to run a fairly wide range. For example, the condition and suitability as per code requirements and specific educational program needs of aspects like lighting, windows, floors, exit doors, roof drainage, air conditioning, and sprinkler systems, are mostly unpredictable. Given the hard materials and surfaces of industrial buildings, however,

it is fair to assume that some acoustical treatment (such as paneled ceilings or carpeting or both) will be desirable.

In spite of potential problems it is possible to find loft buildings in good condition and in compliance with codes which, with little more than spit and polish, can be comfortably occupied by an open space educational program. Conversely, at the other extreme are industrial buildings which are veritable sponges (dripping water while at the same time soaking up improvements and funds), filled with code violations, deteriorating conditions, and still to be discovered new problems. In this respect there appears to be a direct correlation between building size and code violations: the larger the building, the greater the problems (e.g., the Fifth and Luzerne Street Building).

In sum, particularly for loft buildings, there are no easy rules for conversion and no substitute for caution and careful planning.

BUILDING TYPE SHEET: LOFT BUILDINGS, FACTORIES AND WAREHOUSES

Characteristics	Advantages	Disadvantages
Spatial and Structural:		
• Large basically rectangular open space configurations, with few, if any, interior *structural* walls.	• Flexibility for open space educational programs: potentially effective designs *include a central* common media or resource area with encircling open space areas, or small central conference rooms surrounded by open space: or either of these patterns reversed - i.e., special rooms on the periphery.	• The broad dimensions of most loft buildings are too wide to be efficiently subdivided into conventional classrooms if fenestration is required for all instructional spaces - unless the space is provided with skylights. Further, in large buildings the addition of fire separations may be required in large areas to satisfy fire requirements.
• Stories: Generally identical floors in multi-storied buildings (e.g., 4 to 6 floors).	• Compactness on a single site.	• Compounds problems of circulation with the vertical element.
•Age and Location: Due to the economics of building, loft buildings tend to be older and located in urban areas.		• Unless modernized during its lifetime it is likely to have problems associated with old buildings: aging and malfunctioning systems and equipment: and features adequate to old codes but not to modern standards (such as HVAC: see below).
• Structure: Loft buildings are usually solidly constructed of heavy masonry and steel, designed to support heavy machinery and materials (thus have high load-bearing capacities), and generally meet standards of high fireproof classification.	• Structural capacities and building sturdiness should be more than adequate for any school need.	• Major structural modifications, if necessary or desired, will entail difficulties due to the durability of original materials.
• Columns: Regularly distributed along a rectangular grid. The older and taller the building, the thicker the columns and the more narrow the grid is likely to be.		• Thick columns and narrow grid placements present the most obvious limitation on the redesign of floor spaces: they hinder sight lines, movement, and flexibility in the creation of large group instructional audio-visual, or play areas.
• Further, such grid patterns tend to exert an extremely powerful influence on the use of space, tending to result in the formation of bays - rectangular, self-contained territories - even when partitions are not provided.	• Good for instructional programs which benefit from well defined territories (like self-contained classroom teaching).	• Grid tends to interfere with open space programing, team teaching, and free interchange, resulting instead in a psychology of private territories. It is difficult - but possible - to break the power of the grid.
• Circulation: Designed for movement of potentially ponderous equipment, materials, and products (via freight elevators) and small numbers of people. Vertical circulation is as important a factor as horizontal movement in such buildings.	• Equipped with elevators.	• Such buildings are not normally designed for efficient and frequent circulation of large numbers of people. Freight elevators are unsuitable for children, slow, and often expensive to convert: existing stairways will generally require modifications and new ones may be needed.
• Ceilings: Loft buildings customarily have untreated high ceilings (e.g., 12 to 15 feet).	• Such high ceilings facilitate remodeling, providing plenty of space for the installation of new or additional ductwork, lighting, or other services, together with dropped acoustical paneling if desired. • Further, such ceiling heights are adequate for play space for young children.	• Such ceiling heights are not readily adaptable for secondary school gymnasium use. A hung ceiling would probably be desired for acoustical purposes and mechanical distribution.
• Windows: Loft buildings are usually (but not always) well fenestrated: the type and quality of the windows, however, varies.	• Depends on the type and quality of the windows: potentially good natural light and ventilation.	• The height, type, and operability of windows must be checked for compliance to local standards for educational use. Permitted uses of central areas may depend on proximity to fenestration.

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LOFT BUILDINGS, FACTORIES AND WAREHOUSES-continued

Characteristics	Advantages	Disadvantages
Occupancy Factors		
• Stairways and Exits: generally located in fire towers or in fire-protected enclosures.	• Existing stairways and exits are generally usable with few modifications.	• Additional stairways may be required for increased occupancy level. (Must have fire exit within fixed distance - e.g., 90 feet - of any instructional area.)
• Maximum occupancy based on floor area (that is, based on minimum net floor area per occupant) is about 1/10 occupancy permitted for schools. E.g., in N.Y.C. 200 sf per occupant required for industrial buildings; 20 sf for classroom use.)	• Permits much greater space per pupil at existing occupancy levels; or permits an increased occupancy.	• To increase pupil occupancy to level permitted by floor area certain other modifications may be necessary (e.g., exits, stairs, HVAC).
• The structural bearing capacity of the floors is as high as, or generally much higher than, any educational program requirements (e.g., 100 to 150 psf in N.Y.C. for industrial and warehouse buildings; 40 to 60 psf for instructional uses).	• Structural conditions should be more than adequate. Regardless of renovations or additions, structural reinforcement should not be necessary.	
• Toilets and sanitary services: Designed for original use occupancy, frequently clustered in a single location.		• Number of toilets will probably be insufficient for increased occupancy level of school. If additional toilet areas are required the existing piping may require modifications or extensions.
Systems and Services		
• Electrical services: Designed for electrical needs far in excess of almost any school program.	• Should be adequate for needs of any school program. Particularly suitable to specialized industrial education programs.	• Protective installations or modifications may be necessary for high-voltage transformers and gear switches.
• Lighting: Conditions will vary considerably between and within different buildings, from high intensity illumination for demanding industrial tasks to less lighting in warehouses.		
• Elevators: Generally designed for freight movement.	• Has elevator(s)	• Freight elevators will require conversion if they are to be used for passenger use.
• HVAC system: In older buildings frequently has little or no accomodation for air circulation and ventilation. May or may not be air conditioned.		• New ventilation system may be required as well as extensive modifications to existing ductwork.
• Sprinklers: Probably required by code and installed.	• Sprinklers probably necessary for such multi-story buildings regardless of fireproof construction.	• If not provided, the installation of sprinklers may be required.
• Outdoors and Site: Constricted site, probably with limited parking and open space (for which reason loft type structure probably chosen).		• Lack of parking and outdoor play space will be problems.

Bowling Alleys

Summary of Considerations

The broad scale construction of bowling alleys during the last decade, like school buildings in some places, has outpaced demand. Overbuilt to meet the demands of a fad that has peaked, many have been forced out of business. Consequently bowling alleys constitute a building type that, for the present at least, is frequently available for recycling consideration.

Normally a single or at most double-story building, the undivided, air conditioned, open space design of bowling alleys has many potential benefits for conversion to educational uses. The plumbing, hookups, and kitchen facilities of connected restaurant establishments, an electrical service and system designed to meet the demands of pin-setting equipment, an HVAC system designed for a smaller but more active occupancy than a school, and the large undivided open space are all potentially suited to easy conversion for school needs. Acceptable zoning, central or easily accessible location, facilities for parking and/or open space, and attractive decorations and appearance are also characteristics important for school use.

The re-use characteristics of other aspects of these buildings are, however, ambiguous - depending on the specific building and specific program needs - as relates to found space conversion (such as lighting intensities, grade level changes, HVAC zones, and structural bearing capacities).

What can be stated with assurance is that bowling alleys

will not be suitable to immediate, "as is" educational program occupancy, unless of course, that unlikely educational purpose is bowling instruction (in which case nothing could be better). At a minimum, modifications to the floors will be necessary. For an increased occupancy, based on floor area as permitted for school use, the building will also probably require additional exits, stairways, and toilets and boosted lighting levels in certain areas. Depending on pertinent codes, cutting new windows in existing walls may also be necessary.

Consequently conversion of bowling alleys in most circumstances should only be considered for medium- to long-term use needs (i.e., 7 years or more). Otherwise the value of the renovation will not be recovered.

BUILDING TYPE SHEET: BOWLING ALLEYS

Characteristics	Advantages	Disadvantages
Spatial and Structural		
• Basically open space interior, with few, if any, columns or other structural divisions.	• Compatible with open space educational programs.	• Requires partitioning for self-contained classrooms; use of the center area of the building is limited if natural light or ventilation is required by codes.
• Stepped levels (for observers) leading to lanes.	• Split level can be used, in part, for a stage; level differences can delimit separation of functions (i.e., offices from instruction) or in other ways can enhance spatial variety.	• Usually requires ramping for areas of circulation; can handicap freedom of design and can constrain dimensions of classrooms and other areas.
• Acc stical, panel, dropped ceil , which often curves dow ard near the pinset end of e alley area.	• Good acoustical characteristics; (designed to control bowling noise).	• Sloped end is probably not usable "as is" will require modification.
• The dropped ceiling height is generally the same as that for instructional spaces (about 9 feet) while the structural ceiling (about 12-14 feet) allows sufficient space for new ductwork, if necessary.		• Such ceiling heights are not readily adaptable for gymnasium use.
• Large area, high ceiling, lobbies (in some instances).	• May be modifiable for gym use.	• Location within context of building and siting may hinder its use for anything other than an entrance.
• Hard wood, uneven floors (due to ball gutters) in lane area, and below floor level conduits for bowling ball return.	• Ball return conduits may be used for locating electrical wiring, outlets, and perhaps some of the plumbing.	• Floors will require leveling.
• Normally one or two stories only.	• Compact, facilitating circulation and centrality.	
• Adjoining commercial spaces (e.g., bars, restaurants, or fast food establishments, lounges, baby sitting services, and the like).	• Particularly the food-related establishments may be adapted for kitchen and cafeteria purposes. Separate and defined spaces may be used for a variety of purposes (e.g., offices, separate kindergarten, special purpose rooms).	• Such spaces may not suit individual needs and thus may inhibit the design concept.
Occupancy Factors		
• Stairways and exits are generally designed according to the same standards as required for educational use. Thus: However, the occupancy of a bowling alley is clustered in one-half of the building and it is in relation to that occupancy that the stairways and exits are located.	• existing stairways and exits are usable.	• If occupancy increases, more exits and stairways may be required. In addition, depending on the size of the area and location of the exits, new exits may be required to use what were previously low-occupancy areas (i.e., the lanes and pinset machine end of the bowling alley).
• Maximum occupancy, based on floor area (that is, based on net floor area per occupant) for bowling activity is about one-half occupancy permitted for schools. (E.g. in N.Y.C. 50 sf per occupant required for bowling alleys; 20 sf for classroom use.)	• Permits greater space per pupil at existing occupancy levels.	• To increase pupil capacity to level permitted by floor area, modifications in exits and stairways will probably be necessary.
• Live load capacity per square foot (i.e., the structural bearing capacity of the floors) is usually the same as the standard for classroom use (i.e., 40 lbs/sf for both according to N.Y.C. code) but may be less than code requirements for an open space school (e.g., in N.Y.C. open space qualifies as a "place of assembly a 60/lbs/sf requirement).	• Structural condition should be adequate; need for reinforcement unlikely.	• Extensive structural additions, such as a new floor (as required in the Newtown H.S. Annex), partitions, or oth r extensive additions which increase the "dead load" will in turn decrease the live load and may thereby result in the need for structural reinforcement
• Windows: With the exception of the front facade, bowling alleys are generally designed with few windows.	• Absence of windows is generally believed to be energy-conserving; solid walls are also good insulation against outside noise; windowlessness may also reduce outside distractions; and avoids potentially expensive vandalism costs.	• Absence of natural light and ventilation; in many places insufficiency or lack of windows is not accepted by codes for educational facilities. Windows can be punched into walls.

BOWLING ALLEYS-continued

Characteristics	Advantages	Disadvantages
- Toilets and sanitary services: Designed for the occupancy level and frequently clustered in one or two areas only.	- Existing services may be used "as is"; if additional toilets and basins are needed, existing supply and drainage pipes are usually adequate for increased demand.	- Number of toilets will probably be insufficient for increased occupancy level of school. If additional toilet areas are required or desired the existing mains may require modifications or extensions.
- Electrical services: Designed to run pin-setting equipment as well as normal electric needs.	- Should be adequate for needs of most school programs.	- May be inadequate for vocational programs or other educational programs which require heavy machinery or extensive electrical equipment.
Uniform lighting: Within area but varying between areas; e.g., generally slightly darker over the broad area of lanes; generally numerous lighting zones (e.g., clusters of 3 or 4 lanes controlled by a single switch.	- May be suitable for programs with varying lighting needs. In an open space design the darker center area can be used as a media center or as an individual study area with separate carrels and direct lighting by desk or spot lamps. For such uses the zonal controls are especially handy.	- Will require extensive modifications if uniform light levels are desired throughout.
- HVAC system: Buildings are usually air conditioned, ventilated, and heated to meet the needs of active occupants. With the exception of ancillary areas, ductwork and HVAC zoning are designed for uniform temperature and comfort levels through a large, open expanse.	- Air conditioning. The HVAC system is probably adequate, comfortwise, to the requirements of a mostly sedate, though higher occupancy.	- The absence of HVAC zones limits use flexibility unless extensive modifications are made to the system; additional ductwork may be necessary.
- Parking Facilities: (Open space) either a black-topped lot or underground garage are normally available for customer convenience.	- These facilities would be available to school - either as parking for staff, or converted play area for the students.	- The location and type of parking must be examined: if the parking faces a major avenue or highway or is shared by a shopping center, it may be more of a hazard.
<u>Esthetics</u>		
- As places of recreation most bowling alleys must be attractively decorated, comfortable, and clean - appealing in one way or another to the esthetic sensibilities of their clientele.	- The non-institutionality, tasteful decor and commodiousness can be beneficially incorporated into the educational program. Floor-level changes (described above) present opportunities for creative design.	- "Beauty is in the eyes of the beholder." The bowling alley's esthetics may go unappreciated or be inappropriate for the educational process.

APPENDIX H

CASE STUDIES

PENNRIDGE CENTRAL ANNEX

Address: Perkasie, Pa. Previously: Girdle Factory

Opened: September 1971 Acquisition: Purchase

Educational Program

Capacity: 300.

Grade Organization: Used as annex for 4 seventh grade sections and for federally funded high school business education program; one eighth grade section.

Program Description: Open space, team teaching for four sections (±140) of homogeneously selected seventh graders; used as special purpose annex for high school business education program; science room also used by eight grade sections in the afternoon.

Comments: The Pennridge Central JHS and HS are located on the adjacent site; thus movement back and forth between the main buildings and annex, is easy.

Location

Neighborhood: Rural area approximately 1¼ hours north of Philadelphia; the annex building is located on an 18 acre cleared site (with private road access) adjacent to the central schools and across the road from large farms.

Student Population: All the students are enrolled in the adjacent schools which draw their enrollment from the entire central school district which is comprised of 4 boroughs and 4 townships and approximately 100 square miles.

Facilities Inventory

Instructional: 2 large open space areas (approximately 3200 and 5200 sf); 2 large classrooms (approximately 900 sf each).

Special Instructional: Business education (in largest open area); science (in one classroom); media center.

Support: Administrative office; teachers' lounge; teachers workroom; kitchenette; small cafeteria/media room ; storage, coat rooms.

PENNRIDGE CENTRAL ANNEX-continued

Building

Area: 15,000 sf.

Stories: 1.

Age: 1965.*

Renovations: None.**

Structure: Cinderblock and steel; 3 exposed interior columns at 30' intervals (support structure roughly on 30 foot by 34 foot grid).

HVAC: 4 zones; electric/air system.

AC: Throughout entire building.

Sanitary: Girls' lavatory is adequate; boys' lavatory would require expansion to meet standards; also, single stall mens' and womens' toilets.

Electrical: Adequate to meet requirements of extensive electric business machines (eg. 70 electric typewriters, 12 calculators, copying equipment, etc.) and audio visual equipment, as well as mechanical services of building; suspended drop wires (from ceiling joists) supply current to business machines allowing ease of movement and flexibility in arrangements.

Lighting: Mostly at or above standards (averaging 55-95 FCs) but with considerable variation and numerous dark spots (eg. 25 FCs).

Comments: Continuous strip of industrial, pivoting type clerestory windows (just above eye level) along 2½ of the 4 exterior walls of the building; operable, full size windows along remaining walls; building was ruled substandard (ie. unsuitable for permanent instructional use) by Pennsylvania State Education Department because of the clerestory fenestration and insufficient toilets; intercom connected with main building; chalkboard and displayboards, which double as space dividers, on casters; carpeting throughout instructional areas.

Extent of Renovation (circled)***

0	1	2	3	4	5
(None)					(Complete)

*Age indicates date of original construction.

**Renovations indicate year of building modernizations prior to conversion to a school.

***The meaning of the numbers, rating the extent of

PENNRIDGE CENTRAL ANNEX-continued

Comments: The renovations of this building were not extensive (amounting to about $50,000), were mostly cosmetic, and were performed mostly by local school district personnel during the summer prior to opening. Additional toilets and urinals were installed; an air conditioning unit was added to the one small un - airconditioned area (the former shipping and receiving area); the wiring was rearranged and drop cords added for the business machines; a two directional swinging exterior door was added (a state requirement for the handicapped); shelves and single room dividing partitions were constructed; carpeting was installed, and the building was completely painted.

The original building had its own well water and sewerage system. While laying new pipes to tie these into the city system (as required by the health code) telephone and intercom wiring connecting to the main building were also added.

None of these items posed any great problem.

Environmental Considerations

Spatial: The various rooms, and particularly the open space areas are large, flexible, and commodious within their capacity limits. The seventh grade open space area is crowded, however, as a result of a miscalculation by the school administration which neglected to allow space for circulation. The use and capacity of the annex would have to be modified considerably, of course, if extensive backup facilities were not available in the main buildings.

The clerestory windows and unfinished ceilings (with exposed pipes and ducts) give an added dimension of spaciousness and an "open feeling."

Visual: Lighting levels, though somewhat erratic - with dark spots and areas of glare - are basically adequate, generally congruent with task needs. (E.g. light levels in the Business Ed. areas tend to range from 80-100 FCs.) In addition to the open ceiling, bright colors painted on selected spots (eg. columns, space dividers) enliven the quality of the space.

Acoustical: The most noteworthy environmental problem is noise. Noise generated by the business machines and the HVAC machinery reverberates in the unfinished ceiling and against the hard walls, insufficiently absorbed by the carpeting. For example, it interferes with dictation, an integral part of the business program. Patch acoustical tiling installed around a major air

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renovation, is: (1) cleaning and cosmetic patching; (3) systems upgrading, minor structural changes, and non-structural modifications; (5) complete gutting and new systems; and (2) and (4) are in between.

PENNRIDGE CENTRAL ANNEX-continued

duct after the first year of operation improved but did not resolve the situation.

Thermal: Except for the noise it generates, the HVAC system has been fine.

Esthetic: With the exception of the acoustical problem the building is flexible and open, simple yet comfortable, and, based on user comments, pleasant and conducive to informality.

Time

Planning to Opening: 9 months (approximately ¼ the time for a new building).

Design and Construction: 3 months (approximately 1/6 the time for a new building).

Cost and Financing

	Annual Cost				Total Cost	
	Per Pupil		Per Square Foot			
Purchase: Conditions	$	As % of New	$	As % of New	$	As % of New
30 year, unaided resale	50	30	1.00	65	450,535	20
30 year, unaided, no resale	67	41	1.35	88	606,438	27
30 year, aided, no resale	50	30	.99	65	447,168	20
Legal life(3) unaided, resale	-86*	-52	-1.71	-111	-77,141	-3

Comments: The costs represent projected total and annual "present values" per pupil and per square foot respectively over the remaining lifetime of the building, assumed to be 30 years, and for the legal life use as a school, 3 years.

Pennsylvania state building aid is never available for

*A minus sign ("-") designates a profit.

buildings deemed to be "substandard," not suitable for permanent instructional use. For such buildings, like this one, the permitted use for instructional purposes is 3 years.

The figures show that under all the various conditions this building is cheaper than a new one. The value of the building and land has escalated considerably since purchased by the school district. Resale after the three year legal life would result in a profit to the school district.

Since the previous owners (girdle manufacturers) went bankrupt, lease was never contemplated.

Miscellaneous Comments

The relatively greater value per pupil than per square foot ("As % of New" in the cost analysis) reflects the absence of some special facilities in this converted building.

An evaluation of the attitudes and achievement of the seventh grade sections in the annex, compared to the main building, performed by the school district following the first year of operation, revealed higher achievement in reading by the annex students, no significant difference in the other achievement areas tested, and overwhelmingly positive attitudes by the annex students.

Teacher evaluations and comments focused primarily on the issue of open space organization. Annex teachers, following initial fears, appear to be delighted with their circumstances despite the extra work they have found that open space teaching entails.

Subsequent to the three year limit on the use of the annex for school purposes (unless an extension can be obtained) the school district expects to reconvert the building for use as an administrative building.

HERNANDEZ BILINGUAL SCHOOL

Address: Boston, Mass.

Opened: September 1971

Previously: Robie Ford Automobile showroom and repair garage

Acquisition: Purchase

Educational Program

Capacity: 200.

Grade Organization: Grades K-4.

Program Description: Bilingual program in self-contained yet "open" (i.e. within interest area organization) classrooms; some team teaching; central kitchen for Boston city schools is located in connected building.

Comments: Special experimental school connected to local elementary school district.

Location

Neighborhood: "Bad" - that is, blighted - residential and commercial area; the converted building is immediately located on a triangular site on a large, but not heavily trafficked road, with a railroad track running parallel to, and about 50 feet away from, one side of the building.

Student Population: Students are drawn from the local neighborhood.

Facilities Inventory*

Instructional: 8 classrooms including K.

Special Instructional: Remedial reading room; small room for library/music; play space; outdoor play area.

Support: Administrative offices/ conference room; nurse's office; frozen food kitchenette; teacher's room/small group room; storage; parking lot; (more storage).

Comments: Students eat -breakfast and lunch- in classrooms.

*Parentheses "(...)" indicate facilities not included and notably lacking.

HERNANDEZ BILINGUAL SCHOOL-continued

Building*

Area: 17,000 sf (to school portion of building; adjoining central kitchen occupies 27,000 sf building addition); 12,500 sf playground; and 27,700 sf parking lot (on side of central kitchen).

Stories: 1.

Age: 1925;** 1966 addition (now houses central kitchen).

Renovations: N.A.***

Structure: Masonry and steel; umbrella like columns 2½ feet in diameter, on approximately 26' on center grid.

HVAC: Pneumatically controlled, electric univents in each room.

AC: None in school portion (with exception of AC unit for custodial office and kitchenette); complete AC to central kitchen.

Sanitary: Adequate (boys, girls and staff toilet areas, with separate boys' and girls' toilets for Kindergarten, and additional facilities for custodian and nurse).

Electrical: Adequate; 1600 amps; (Note: entirely electrically operated building including heating, kitchenette equipment, lights).

Lighting: Above standard, and rather uniform (70-85 FCs) in instructional areas; 80 mercury spots illuminate play area (ranging from 30 to 100 FCs).

Elevators: None (Note: automobile elevator to rooftop parking areas is not working and has been enclosed).

Comments: Carpeted classrooms are arranged along three fenestrated sides of the school portion of the building, all plumbing and sanitary facilities are located along the fourth wall which separates the school from the central kitchen, and the play space and corridors are placed in the center of the school; several irregular shaped classrooms; 2 classrooms connected by operable partition; 2½ foor diameter, brightly painted umbrella columns every 26 feet (on center); roof leaks in spots; "Lexan" windows.

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*Refers only to school portion of the building, not the central kitchen, unless stated otherwise.

**Age indicates date of original construction.

***Renovations indicate year of building modernizations prior to conversion to a school.

HERNANDEZ BILINGUAL SCHOOL-continued

Extent of Renovations (circled)*

0	1	2	3	4	5
(None)					(Complete)

Comments: The building was entirely gutted, including most exterior walls (previously mostly plate glass windows). The automobile elevator and the ramp to the roof parking were closed off. With the exception of a roof leak near the elevator shaft the building is structurally sound. Classrooms were arranged to capture natural light and all sanitary and kitchen equipment were located along a single plumbing line near the connecting wall between the two sections of the building. The school is housed in the older of the two building sections. Inferior equipment and sloppy workmanship are occasionally evident in an otherwise "clean" renovation. For example, thermostats in most rooms are inexplicably located near the center of chalkboards; water spouts on sinks in the Kindergarten classroom are located too close to the edge and spray water all over the floor; and some of the windows do not open properly.

Environmental Considerations

Spatial: The school is small, informal and intimate, feelings which are influenced by the bright colors (particularly on the columns) and the spatial arrangement of classrooms clustered around a common play space (buffered by a strip). The irregular rooms (non-rectangular) with odd shaped corners have worked particularly well for "open" interest area classroom organizations. The lack of a cafeteria and the consequent eating in rooms appears to have fostered informality and intimacy as well as eating time spillage and messiness.

Visual: Bright cheerful colors and high intensity, uniform light levels, in instructional areas at least, contribute to excellent visual characteristics, slightly mitigated by occasional visual oddities (such as a thermostat in the middle of a chalkboard).

Acoustic: The acoustical qualities of the building are good. Soundproofing between classrooms is excellent. The noise generated by passing freight trains, according to staff, does not interfere with Kindergarten and first grade instruction (in the classrooms closest to the train tracks). Instead, counting the trains is incorporated as an instructional game.

*The meaning of the numbers, rating the extent of renovation is: (1) cleaning and cosmetic patching; (3) systems upgrading, minor structural changes, and non-structural modifications; (5) complete gutting and new systems; and (2) and (4) are in between.

HERNANDEZ BILINGUAL SCHOOL-continued

Thermal: Temperature has been a problem with univents frequently breaking or in need of adjustment. It is not clear whether the system was never properly balanced, whether the thermostats were improperly calibrated, or whether the brand of univents installed is simply too sensitive for school use. Paperclips, pencils and other small objects have fallen through the holes and caused breakdowns.

Esthetic: Taken as a whole the converted school building is simple yet imaginative, intimate, cheery and functional. Teachers comment that they like, among other things, the small size, irregular shaped rooms, bright colors, sturdiness and newness of the building. The problems, such as the heating, and leaky roof are annoyances but they do not detract from the general enthusiasm.

Time

Planning to Opening: 16 months (about 2/5 time for a new building).

Design and Construction: 12 months (about ½ time for a new building).

Cost and Financing

	Annual Cost				Total Cost	
	Per Pupil		Per Square Foot			
Purchase: Conditions	$	As % of New	$	As % of New	$	As % of New
Unaided, Resale	300	111	3.54	174	1,502,448	62
Unaided, No resale	313	116	3.68	181	1,566,066	64
Aided, No resale	233	86	2.75	135	1,166,626	48

Comments: The costs represent projected total and annual "present values" per pupil and per square foot respectively over the remaining lifetime of the building, assumed to be 25 years.

This automobile showroom was acquired and renovated by the Boston Public Facilities Department for the Boston School Committee. At the time of acquisition state aid was not available for converted non-school buildings. The law has since

been changed and such aid is currently available, though not retroactively.

The figures indicate that, without aid, for long term use (45 years) this converted building costs more than a new one. With aid, the building would have been less expensive per pupil but still more costly per square foot, than a new building. The assumed purchase cost of the school building ($260,000) in this case is a prorated portion of the purchase cost of the entire school-kitchen complex ($650,000 total).

Miscellaneous Comments

The relatively greater value per pupil than per square foot ("As % of New" in cost analysis) reflects the absence of some special facilities in this converted building.

P.S. 211-BRONX

<u>Address</u>: Bronx, New York — <u>Previously</u>: Industrial Building

<u>Opened</u>: October 1969 — <u>Acquisition</u>: 15 year lease

Educational Program

<u>Capacity</u>: 670 (750 in actual use).

<u>Grade Organization</u>: Ungraded (equivalent of grades 1-4).

<u>Program Description</u>: Open space, ungraded, bilingual program, with extensive team teaching; open space areas, however, tend to be organized into "classrooms," with four teaching stations per area. Experimental "Community School" rather than neighborhood school; program strictly administered; seven period day.

Location

<u>Neighborhood</u>: Mixed area with residential, some industrial and light commercial in or near immediate area; a major business area is one block away and a local JHS is diagonally across the street.

<u>Student Population</u>: District wide enrollment (District 12, Bronx) with over 90% of the students bused. Approximately 75% of the students are Spanish speaking.

Facilities Inventory*

<u>Instructional</u>: 6 open space areas -2 per floor; 6 small seminar rooms -2 per floor.

<u>Special Instructional</u>: Music room-in teachers' cafeteria; small library; gym in penthouse on roof; outdoor playground.

<u>Support</u>: Administrative offices; nurse's office; cafetorium/gym; frozen food kitchen; teacher's room; some storage (more storage).

<u>Comments</u>: The indoor play areas are not fully satisfactory. Access to the roof gym is through a short 15 foot covered but unenclosed on one side passageway which is felt to be a health hazard in cold weather. The ground floor cafetorium/gym is excessively noisy and is used for other pusposes. Both

*Parentheses "(...)" indicate facilities not included and notably lacking.

spaces are interrupted by heavy columns; sheetrock wall and column covers are easily damaged. Eleven foot high ceiling beams in the roof gyn also limit ball playing.

Building

Area: 45,000 sf.

Stories: 4½ (penthouse gym on fifth floor) plus basement.

Age: N.A. (Approximately 1930s).*

Renovations: N.A.**

Structure: Masonry and steel; columns, ranging from 2 feet to 9 inches in diameter (depending on the floor) are located along a 18½ foot by 15 foot grid.

Stairways: 2 remote, enclosed stairways.

HV: Usually 2 zones per floor, oil and steam system.

AC: No.

Sanitary and Plumbing: Adequate (2 sets of toilet areas per floor); sprinkler system throughout; no showers or locker rooms.

Electrical: Adequate.

Lighting: Meets standards (averages 55 to 80 FCs).

Elevators: 2, manually operated (one passenger, one freight, generally for staff use only).

Comments: Extensive fenestration: industrial pivoting windows enclosed in metal sash; two metal stairways on opposite corners of this rectangular block building; carpeting and acoustical ceilings throughout instructional areas; storage cabinet display boards and other specially selected furnishings - all on casters - double as space dividers; leaky roof (recently repaired).

Extent of Renovation (circled)***

0	1	2	3	4	5
(None)					(Complete)

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*Age indicates the date of original building construction.

**Renovations indicate year of building modernizations prior to conversion to a school.

***The meaning of the numbers, rating the extent of renovation, is: (1) cleaning and cosmetic patching; (3) systems upgrading, minor structural changes, and non-structural modifications; (5) complete gutting and new systems; and (2) and (4) are in between.

P.S. 211-BRONX-continued

Comments: The conversion of this building for school purposes was prepared under the auspices of the landlord to NYCBE specifications. Most of the plumbing and electrical components are new. The HV system was salvaged in part and substantially supplemented: an existing, but inadequate boiler was retained and a new one added. Originally unventilated, a recirculating air system was installed. A fire wall separating each of the second through fourth floors into two areas was constructed to satisfy codes. Light patching to the roof proved inadequate and major repairs, belatedly, were necessary.

Environmental Considerations

Spatial: Open space areas feel large enough to be flexible yet small enough to be intimate (approximately 4000 sf each), the later quality enhanced by the carpeting and new acoustical ceiling. Two remote staircases, however, are less than fully satisfactory in this 4½ story building in which vertical class circulation is, of necessity, heavy. (School officials believe that 2 stairways per location - one up, one down - as in traditional NYC schools would have been better.) Insufficient small group meeting rooms and storage rooms were planned; the moveable cabinets have been found inadequate for these needs.

Visual: Extensive windows, good lighting (bright and even) with 6 light zones per open space area, result in good visual qualities.

Acoustical: Carpeting, acoustical ceilings, and furniture appear to control noise in the open space areas. The acoustical characteristics of the first floor cafetorium and the penthouse gym (with untreated ceilings and asbestos tiled floors) and the metal stairways are very poor. In these spaces noise tends to reverberate and sometimes seems to amplify.

Thermal: After some initial difficulties, and subsequent modifications, the quirks of the heating system have more or less been adjusted to. Specifically, the old boiler takes some time to warm up; the new one compensates for it. The extensive windows, many of which do not close flush, result in considerable heat loss, and occassional drafts. Also, thermostats were poorly located with respect to the building's orientation (along a windowed, sun receiving wall, for example), and the system's balance was not adjusted accordingly.

Esthetic: The somewhat plush interior of the learning areas is a distinct contrast to the stark industrial masonry and sash exterior, a constrast that to a large extent characterizes this converted school building.

P.S. 211-BRONX-continued

Time

Planning to Opening: 21 months (about ¼ the time for a new building).

Design and Construction: 12 months (about ½ the time for a new building).

Cost and Financing

	Annual Cost				Total Cost	
	Per Pupil		Per Square Foot			
Purchase Conditions	$	As % of New	$	As % of New	$	As % of New
Unaided lease	183	95	2.72	113	1,836,751	32

Comments: The costs represent projected total and annual "present values" per pupil and per square foot respectively for this converted building leased by the NYC Board of Education for 15 years.

Renovations of the building for school use were performed under the auspices of the landlord according to NYCBE specifications. The annual rental payments of $133,000 for the first 10 years of the lease includes an amount to amortize the cost of renovations. This amount is based on a construction cost to the owner of approximately $600,000, plus a percentage of interest. The annual rent for the last 5 years is $56,000. The actual cost to the owner of the renovations may be more or less than the negotiated amount.

State aid is not available to reduce the cost of this building to the NYCBE.

The figures indicate that, while the total cost is considerably less expensive (1/3) than a new building over the short term (15 years), this converted leased building costs slightly less per pupil and somewhat more per square foot on an annual basis over the long term.

Further projections suggest that purchase and conversion of this building would have been more expensive than either the lease or a new building over the long term.

Miscellaneous Comments

The relatively greater value per pupil than per square foot ("As % of New" in the Cost Analysis) reflects the more intense utilization and the absence of many special facilities in this converted building.

P.S. 211-BRONX-continued

School staff now seem generally pleased with the school and the performance of the building. The greatest problem remains the lack of adequate outdoor play space; a side street, closed off and used at recess, is not satisfactory.

Numerous problems related to the facility, most of them of a minor nature (settling in, unfinished details, etc.), a few of which resulted in jurisdictional disputes between the tenant and the landlord, have now been mostly resolved. Major costs to the tenant (the NYCBE) were incurred in the repair of the leaky roof as well as in the damage to the fourth floor.

P.S. 232-BRONX

Address: Bronx, New York — Previously: Bruckner Bowling Lanes

Opened: September 1970 — Acquisition: 10 year lease

Educational Program

Capacity: 800.

Grade Organization: 5th and 6th grades.

Program Description: Heterogeneous grouping in self-contained classrooms. Designated experimental school. Philosophic emphasis in "humanistic" education.

Comments: Liberally run, friendly, innovative school, notwithstanding the basically traditional 7 period program organization. Tight knit, enthusiastic staff.

Location

Neighborhood: Rapidly growing lower and lower/middle income high-rise residential area. The building itself is isolated on a triangle bounded by a small commercial area, a park, a major expressway (The Bruckner Expressway), almost all of which are surrounded by high rise apartments.

Student Population: Over 90% of the students are bused to school.

Facilities Inventory*

Instructional: 31 classrooms.

Special Instructional**: 2 science; art; music; typing; outdoor playground; (full height gymnasium).

Support: Administrative offices; multipurpose cafeteria/auditorium/gym; frozen food kitchen; teachers' cafeteria/workroom; nurse's room.

Building

Area: 58,000 sf; surrounded by 73,000 sf blacktopped playyard.

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*Parentheses "(...)" indicate facilities not included and notably lacking.

**Separate from regular instructional rooms.

P.S. 232 - Continued

Stories: 2.

Age: N.A. (Approximately mid 1950s).*

Renovations: None.**

Structure: Masonry, wood, steel and concrete.

HVAC: 7 zones, gas/forced air system.

AC: Yes (see above).

Sanitary: Adequate (2 sets of toilet areas per floor). No showers or locker rooms. Sprinkler system.

Electrical: Mostly adequate (however, public address system never properly wired).

Lighting: Above Board of Health but slightly below NYC Board of Education standards (i.e. building average is about 50 FCs in classroom areas). Florescent fixtures, however, are not covered by diffusers.

Elevators: None.

Comments: Windowless building; sheetrock partition walls rise slightly above dropped acoustical ceilings (not to structural ceiling); the HVAC system has posed continuous problems; the building condition may be described as adequate but rapidly deteriorating.

Extent of Renovation (circled)***

0	1	2	3	4	5
(None)					(Complete)

Comments: The conversion of this building for school purposes, prepared under the auspices of the landlord/owner, is best characterized as cheap and shoddy. Inferior materials and workmanship are evident throughout. E.g. stairwells were not enclosed; inferior steel doors and door frames do not mesh properly and cannot be locked securely; various items were

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*Age indicates date of original construction.

**Renovations indicate year of building modernizations prior to conversion to a school.

***The meaning of the numbers, rating the extent of renovation is: (1) cleaning and cosmetic patching; (3) systems upgrading, minor structural changes, and non-structural modifications; (5) complete gutting and new systems; and (2) and (4) are in between.

P.S. 232 - Continued

never, incompletely, or improperly installed (including, but not limited to, the P.A. system, water coolers and fire extinguishers, light fixture casings and diffusers, thermostat covers...).

As for the structural modifications during renovation, the building was mostly gutted. Existing systems were reused to the extent possible: the HVAC system was modified and a few new units added; an additional toilet area (for boys, girls, staff) was added in one corner of the building; and two new stairwells were constructed.

Environmental Considerations

Spatial: A sense of crampedness is created by the relatively small rooms (averaging 600 to 650 sf) coupled with the utilization (26 to 30 students per room), and the absence of windows; rectangular grid layout with simple circulation.

Visual: Overall, the building is visually characterized by inferior paint (and thus heavy scuffing of walls), drab colors, contrast and glare (due to undiffused light fixtures), and the lack of relief through windows. Most rooms, however, defy this characterization because of a liberal policy regarding displays and the creativity of teachers and students.

Acoustical: Solid masonry walls effectively block out external noise (especially from the nearby expressway). Acoustical insulation within the building, however, is poor due to thin walls, hard reflective linoleum floors, and an open plenum above the dropped ceiling. Noise travels freely horizontally (between rooms) and to a large extent vertically as well (between floors).

Thermal: After several years of operation the HVAC system is now basically balanced although it still frequently malfunctions. Otherwise the system is adequate.

Esthetic: With the exception of individual, ad hoc displays and decorations, the converted facility is shoddy, flimsy, and totally uninspired, functional, but with handicaps.

Comments: Described by some students as an "old shoebox." The above considerations notwithstanding, staff - almost unanimously - some parents, and some students feel affection toward the building. "It's got a face only a mother could love."

Time

Planning to Opening: 20 months (approximately ½ the time for a new building).

P.S. 232 - Continued

Design and Construction: 9 months (about 2/5 the time for a new building).

Cost and Financing

	Annual Cost				Total Cost	
	Per Pupil		Per Square Foot			
Conditions	$	As % of New	$	As % of New	$	As % of New
Unaided lease	375	184	5.17	198	3,001 111	41

Comments: The costs represent projected total and annual "present values" per pupil and per square foot respectively for this converted building leased by the NYC Board of Education for 10 years.

The figures indicate that while the total cost is considerably cheaper than a new building, the annual values are much higher. Renovations of the building for school use were performed under the auspices of the landlord according to NYCBE specifications. The annual rental payment of $316,271 includes an amount for renovations. This amount is based on a construction cost to the owner of $734,500 plus 10% interest, figures which were negotiated along with the lease. The actual cost to the owner of the renovations may be more or less than the negotiated amount (and in this case was most likely less).

State aid is not available to reduce the cost of this building to the NYCBE.

Projections indicate that for long-term space need, purchase of the building would have been more economical than lease but also more expensive than a new building (based on annual present values).

Miscellaneous Comments

The relatively greater value per pupil than per square foot ("As % of New" in the cost analysis) reflects the absence of many special facilities in this converted building.

The conversion of the Bruckner Bowling Lanes was the result of intense community pressure, an outgrowth of overcrowding in nearby schools. The renovation of the building itself, however, was poorly planned and inadequately supervised. The converted building was originally intended as an annex for junior high school students (grades 7-9) but upon inspection subsequent to construction work, the building was deemed unsuitable for the mandated JHS curriculum. Thus the building was hastily designated as an experimental school for

P.S. 232 - Continued

5th and 6th graders and hurried preparations were made for a fall opening. Staff and parents would have preferred an open space design, especially for the experimental program, but they were never consulted.

Though poorly conceived and troublesome, the converted building is nonetheless adequate, if far from ideal, for the needs of the school. The efforts of the staff who have shown themselves to be creative and resourceful (attempting to turn problems into assets*), have to a large extent, compensated for and perhaps even grown out of the disadvantages of the building.

Many of the numerous problems related to this facility resulted in disputes over responsibility between the landlord and the tenant (the NYCBE) on matters which were not always clearly defined in the terms of the lease. When the disputes dragged on the school, students,and staff suffered.

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*For example, the physical education dance, body movement, and a high quality gymnastics program have been developed to compensate for the limiting 9' ceilings in the multipurpose room.

NEWTOWN H.S. ANNEX

Address: Queens, New York Previously: Bowl-Away Bowling Lanes

Opened: February 1973 Acquisition: Purchase

Educational Program

Capacity: 850 (officially 1000).

Grade Organization: Used as self-contained annex to main building for 9th grade.

Program Description: Self-contained classrooms.

Comments: Basically traditional program schedule ; 7 period day plus lunch, with room changes each period.

Location

Neighborhood: Residential/commercial; located on service road to major expressway (Long Island Expressway).

Student Population: Approximately 80% of students are bused (i.e. by public transportation) drawn from the entire borough.

Main School Building: Inconveniently located over 1 mile away.

Facilities Inventory*

Instructional: 33 classrooms.

Special Instructional:** Sciences; music; shop; art; home economics; library; (gymnasium); (outdoor playground).

Support: Administrative; multi-purpose cafeteria/auditorium; frozen food kitchen; teachers' lounge/workroom/nurse's office; underground parking garage; (student lounge or area).

Building

*Parentheses "(...)" indicate facilities not included and notably lacking.

**Included in count of instructional classrooms.

NEWTOWN H.S. ANNEX-continued

Area: 98,000/63,000 sf*(excluding parking).

Stories: 2 plus basement garage.

Age: N.A**(Approximately mid 1950s).

Renovations:*** None.

Structure: Concrete, masonry and steel; columns, about 9 inches in diameter, located along a 23 foot by 34 foot grid.

HVAC: 6 zones: gas/hot air HVAC combination units.

AC: Yes (zones as above).

Sanitary: Adequate (2 sets of toilet areas per floor); no showers or lockerrooms.

Electrical: Adequate.

Lighting: Above standard (average 75-100 FCs).

Elevators: None.

Comments: Windowless building; asbestos-coated sheetrock partition walls to structural ceiling; leaky roof in spots; otherwise, structurally in new condition.

Extent of Renovation (circled)****

0	1	2	3	4	5
(None)					(Complete)

Comments: A major structural problem posed by unusual "I" beam girders upset above the floor level at 23 foot intervals (parallel to the old alleys) required construction of a new floor as well as reinforcement of selected structural supports to compensate for the consequent increased load (to meet code requirement of 40 lbs/sf live load minimum for classroom use). The few existing windows were closed in; a stairwell was added; and new toilet areas were added off existing mains.

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*Total square footage/net square footage.

**Age indicates date of original construction.

***Renovations indicate year of building modernizations prior to conversion to school.

****The meaning of the numbers, rating the extent of renovation is: (1) cleaning and cosmetic patching; (3) systems upgrading, minor structural changes, and non-structural modifications; (5) complete gutting and new systems; and (2) and (4) are in between.

NEWTOWN H.S. ANNEX-continued

Environmental Considerations

Spatial: A sense of enclosedness is inspired visually and spatially by the bright lights and absence of windows. The lack of any exercise area (indoors or out) further intensifies this feeling. The relatively small size of the school enhances informality and intimacy.

Visual: In addition to excessive brightness, barren walls and antiseptic newness contribute to a feeling of visual sterility.

Acoustical: The acoustical characteristics of the building are excellent, effectively blocking out noise from the adjacent expressway. Noise transmission within the building is also minimal.

Thermal: Adequate; 6 zones of HV and AC with positive pressure ventilation; equipped with fire detection devices including heat sensors, smoke detectors, and alarms.

Esthetic: Unstimulating, barren and sterile (see Visual).

Time

Planning to Opening: 3 years (less than ½ time for a new building).

Design and Construction: 10 months (less than 2/3 the time for a new building).

Cost and Financing

	Annual Cost				Total	
	Per Pupil		Per Square Foot			
Purchase: Conditions	$	As % of New	$	As % of New	$	As % of New
Unaided, No Resale	272	69	3.67	94	5,784,274	38
Aided, No Resale	245	62	3.31	85	5,206,651	35

Comments: The costs represent projected total and annual "present values" per pupil and per square foot respectively over the remaining lifetime of the building, assumed to be 25 years.

NEWTOWN H.S. ANNEX-continued

Although the property was originally negotiated for lease by the Board of Education (at an annual rental of $365,750 for 10 years) in November 1970 it was decided to purchase the building with renovations financed by the capital budget, and design and construction performed by the Board of Education. In actuality renovation costs more than doubled from the initially estimated $850,000 to 1.9 million.

The figures show that in all respects this purchased building is cheaper than a new school building.

Projections indicate that the 10 year lease of this building would have been more expensive on an annual basis than purchase, and about the same per pupil and more expensive per square foot than a new building.

The purchase price of the building has not yet been determined; the building was condemned by the city and as the parties could not agree on a price the matter is awaiting settlement in court (where, due to backlogues, it is likely to remain another year or so).

State building aid reimbursement for this converted school has not yet been allotted.

Miscellaneous Comments

The relatively greater value per pupil than per square foot ("As % of New" in the cost analysis) reflects the more intense utilization and the absence of many special facilities in this converted building.

With regard to Newtown H.S. and the converted annex, many of the teachers indicate a degree of resentment - a feeling of "second cousin status." The feeling is characterized by one teacher's belief that, as far as the school administration is concerned, ninth graders are expendible, and so, by extension, are those who teach them. These feelings apparently have their roots in various administrative matters having to do with faculty selection, assignment, and support, but nevertheless have come to be identified with the annex. Though clean and new, and physically more attractive to most teachers than the deteriorating, dingy, old main high school building, the new, converted bowling alley tends to be viewed as a one year stopping off point (as it is, in fact, for the ninth graders), geographically remote from the main building, and equally remote from the organization with respect to support, supplies, and equipment.

The advantages of isolation and detachment from the main building, also noted by some teachers, though with less fervor, are less interference, more independence, and because of the smaller size building, a greater sense of community and informality.

The underground parking garage is especially appreciated by the teachers and the air conditioning is considered a luxury by all, but not everyone would trade windows for it.

DENNIS C. HALEY SCHOOL

Address: Boston, Mass.
Opened: September 1971

Previously: Big League Bowling Alley
Acquisition: Purchase

Educational Program

Capacity: 380.

Grade Organization: K and ungraded, ages 6-13 (i.e. equivalent to grades K-6).

Program Description: Three separate ungraded "family" groupings in open space areas and two separate kindergarten classrooms; some team teaching.

Comments: Racially integrated (52% white, 48% black); "perfectly balanced" (as defined by Mass. state law). Admission by request rather than assignment by neighborhood, with current waiting list of over 150. The only small size open space school in Boston.

Location

Neighborhood: Low density residential, light commercial; located across the street from a park and undeveloped land.

Student Population: Over 90% of the students are bused from all parts of the city; exceptional in Boston in that Dennis C. Haley is not a neighborhood elementary school.

Facilities Inventory*

Instructional: 3 open space areas; 2 kindergarten classrooms.

Special Instructional: Art room; library; small group room; audio/visual room; outdoor playground; (more small group rooms).

Support: Administrative offices; health office; cafetorium/gym (with platform stage); teachers' lounge/lunchroom; frozen food kitchen; parking lot.

Building

*Parentheses "(...)" indicate facilities not included and notably lacking.

DENNIS C. HALEY SCHOOL-continued

Area: 39,500/36,800 sf;* plus approximately 3½ acres for parking and playground.

Stories: 1 (two levels connected by ramps).

Age: N.A. (approximately 1960).**

Renovations: None***

Structure: Masonry, steel and wood.

HV: Multi-zoned (thermostats in every room; several in large open space areas), gas/air, and univents.

AC: No (original air conditioning was disconnected because insufficient funds were available to convert it for school.)

Sanitary: Adequate (two sets of toilet areas for open space areas, and one for each K classroom, office, and teachers area); no showers, existing sprinkler system eliminated in conversion (not necessary).

Electrical: Adequate; (in open spaces outlets every 10' in floor (wiring run in old ball returns).

Lighting: Above standard (average 75-95 FCs).

Comments: Windows added to satisfy codes at 6% of floor areas); steel asbestos demountable partitions used for all non-bearing walls; combination furniture space dividers; carpeting throughout. Near new condition.

Extent of Renovation (circled)****

0	1	2	3	4	5
(None)					(Complete)

Comments: Although much of the existing HVAC equipment could be used substantial new ductwork was needed for ventilation requirements. Insufficient money was available for both air

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*Total square footage/net square footage.

**Age indicates the data of original building construction.

***Renovations indicate year of building modernizations prior to conversion.

****The meaning of the numbers, rating the extent of renovation is: (1) cleaning and cosmetic patching; (3) systems upgrading, minor structural changes, and non-structural modifications; (5) complete gutting and new systems; and (2) and (4) are in between.

conditioning and a finished playyard and when given the choice the local school officials took a playground. Furniture was carefully selected, with the participation of the architect, in accordance with the school program.

Enivornmental Considerations

Spatial: Though relatively small, the building is spacious at present use levels. Open space areas of slightly varying configurations and proportions are comfortable, clean (architecturally as well as physically) and flexible with almost continuous furniture rearrangements. Circulation is simple and unobtrusive.

Visual: Bright colored walls, good even lighting, and fenestration contribute to clean and cheerful appearance. Variety in vistas and spaces (as well as wall colors) increase visual stimulation.

Acoustical: Carpeting, acoustical ceilings, and furnishings appear to control noise in open areas.

Thermal: Comfortable; HV system has been found to be comfortable with the exception perhaps, of the two weeks before summer closing.

Esthetic: Basic simplicity of renovated school design gains character and interest through variations such as level changes marked by ramps, spatial variety, and color variations.

Comment: The school staff would have liked more private small group rooms adjacent to the open spaces for discussions, consultations and the like. The window requirement of the state code for elementary schools, however, was the controlling factor in this aspect of the design.

Time

Planning to Opening: 8 months (about 1/5 the time for a new building).

Design and Construction: About 6 months (approximately ¼ the time for a new building). Note: the renovation itself took only 2 months, due in large part to extensive "overtime."

Cost and Financing

DENNIS C. HALEY SCHOOL-continued

Purchase: Conditions	Annual Cost Per Pupil $	Annual Cost Per Pupil As % of New	Annual Cost Per Square Foot $	Annual Cost Per Square Foot As % of New	Total Cost $	Total Cost As % of New
Unaided, Resale	269	98	2.38	115	2,824,672	65
Unaided, No resale	279	102	2.48	120	2,933,527	68
Aided, No resale	201	73	1.78	86	2,107,005	49

Comments: The costs represent projected total and annual "present values" per pupil and per square foot respectively over the remaining life use of the building, assumed to be thirty years.

This bowling alley was acquired and renovated by the Boston Public Facilities Department for the Boston School Committee. At the time of acquisition state aid was not available for converted non-school building. The law has since changed and such aid is currently available, though not retroactively.

The figures indicate that for long term use (45 years) this converted building costs about the same per pupil and more per square foot than a new building. Had state aid been available the cost would have been less, without qualifications, than a new building.

Further, it is to be noted that the cost of renovation increased by 44% ($225,000) due to overtime, in order to open the school on schedule. This additional cost represents an annual value of $21 per pupil (8% of the "New" cost) and $.19 per square foot (9% of "New").

Miscellaneous Comments

The relatively greater value per pupil than per square foot ("As % of New" in the cost analysis) reflects the absence of some special facilities in this converted building.

P.S. 26-BURNSIDE MANOR

Address: Bronx, New York

Previously: Burnside Manor Catering Hall

Opened: February 1972

Acquisition: 10 year lease

Educational Program

Capacity: 365 (in actual use).

Grade Organization: Grades 1-3; used as self-contained annex to reduce overcrowding in main building.

Program Description: Cluster organization; 11 separate classes located together in large, open space rooms.

Comments: School is attempting to gradually make transition to open space program organization in open space facility.

Location

Neighborhood: Mixed area: commercial, residential, institutional; annex is immediately located on commercial avenue with several stores on the ground floor rented out.

Student Population: Students are mostly drawn from the local neighborhood.

Main School Building: Located one block away.

Facilities Inventory*

Instructional: 4 large rooms -former ballrooms ; 1 small room -for remedial reading, guidance, etc.

Special Instructional: Auditorium/music room; corridor/play areas; (outdoor Play area).

Support: Administrative offices; kitchen; teachers' room; (cafeteria); storage; (more storage).

Comments: Students eat in classrooms. Nets, ropes, balance bars, and other equipment located in the corridors and lobby are integrated into the program through casual use as well as scheduled play activity.

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*Parentheses "(...)" indicate facilities not included and notably lacking.

Building

Area: 33,000 sf.

Stories: 2½ (only 2 small rooms and a bathroom on third floor), plus small basement used for storage only.

Age: 1906*.

Renovations:** 1936 (from movie house to catering hall), 1948 and 1952 (air conditioning added).

Structure: Masonry and wood frame.

HV: 2 zones, oil and steam system; uneven ventilation system.

AC: Yes; each room separately zoned, original chilled water system with cooling towers on roof.

Sanitary and Plumbing: Insufficient toilets at opening of school now partly corrected by recent addition of new toilet area (2 boys', 2 girls' toilet areas; 2 staff toilets); equipment in original large restaurant kitchen mostly disconnected and replaced with frozen food type equipment.

Electrical: Problematic; existing 400 amp., electrical service is barely adequate for current electrical usage; 15 watt fuses (rather than circuit breakers) continually blowing.

Lighting: Below standard, but with considerable variation (mostly 20-30 FCs in instructional areas, but as high as 100 FCs near windows, 50 FCs under light sources, and as low as 5 FCs in dark spots); incandescent lights in chandeliers and spots provide artificial light; reostats for chandeliers.

Elevators: Yes (for staff only).

Comments: Ballrooms of previous catering hall have been preserved for open space classroom use with chandeliers, velvet curtains, mirrored walls, carpeting surrounding wood dance floors, and in two of the rooms, stages; extensive windows in three of the four instructional rooms, good natural light in two of these (with southern and eastern exposures); chalkboards, storage cabinets on casters, and other portable furniture used as room dividers; grand stairway connects first and second floors; roof leaks in spots; an organ, three pianos and much of the furniture has remained for the use of the school.

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*Age indicates date of original construction.

**Renovations indicate years of building modernizations prior to conversion to a school.

P.S. 26 - Continued

Extent of Renovations (circled)*

0	1	2	3	4	5
(None)					(Complete)

Comments: The conversion of Burnside Manor to a school is of some historic interest as it was the first non-school building leased by the NYCBE and opened in "as is" condition. During the course of negotiations and planning it was decided that rather than extensively renovating the building to make it resemble a school at an estimated cost of $350,000, with minor modifications the building could satisfy all school use code requirements. Carpeting was patched; frozen food kitchen equipment was added necessitating disconnecting other equipment, such as a dishwasher,(because of the inadequacies of the electrical system); a fire alarm system was installed; panic-bar release, double doors were installed on the secondary means of egress (a fire escape out to an alley), and higher wattage light bulbs were inserted in existing fixtures in an attempt to upgrade illumination. Later, another boys' toilet was added and various repairs were made to the air conditioning system. To date the total cost of renovations and repairs has totalled $22,000. Leaks in the roof are to be fixed.

Environmental Considerations

Spatial: Informality and an "intimate, family-like atmosphere" (according to the staff) are fostered, in part, by the relatively small size of the building (though slightly crowded at present use levels), and the grandeur of the spaces and their appointments. The ballrooms lend themselves particularly well to open space programming and have inspired the staff, which though untrained in this approach to instruction, is committed to learning and gradually implementing it through experience. The students seem to particularly enjoy exploring the irregular spaces, back stairway, odd shaped nooks and crannies, some of which are devised by furnishings, and the useable corridors with gym equipment (though these very features often plague the custodial staff).

Visual: Though reostats, chandeliers and indirect florescent

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*The meaning of the numbers, rating the extent of renovation, is (1) cleaning and cosmetic patching; (3) systems upgrading, minor structural changes, and non-structural modifications; (5) complete gutting and new systems; and (2) and (4) are in between.

P.S. 26 - Continued

lighting in ceilings enhance the atmosphere of the spaces, the light levels are generally insufficient for most instructional tasks; replacement of the incandescent chandeliers with florescent fixtures might remedy the light problems without overloading the existing circuitry.

Acoustic: Drapery (which is usually open) and areas of carpeting are not enough to compensate for the sound reflecting characteristics of hard wood dance surfaces and plaster finished ceilings; consequently noise is frequently a problem in the open space rooms though students and staf' are learning to moderate their voices and live with the situation.

Thermal: Heat, ventilation, and air conditioning are unevenly provided to different areas of the building; two thermostatic heating zones for the entire building cannot adjust for the different thermal needs of separate rooms with different uses, amounts of fenestration and orientation; ventilation is similarly uneven; the air conditioning system has more zones and thus, is more sensitive, but it continually breaks down; furthermore, its efficiency is compromised because of a leak in the gas charge.

Esthetic: This building seems particularly condusive to an informal, open educational program, despite its various shortcomings. The relaxed atmosphere that predominates in the school is largely attributed to its relatively small size and the unique, non-institutional characteristics of this building. With a qualified exception for the custodian, the staff and students seem unanimous in their enthusiasm for the building.

Time

Planning to Opening: 17 months (about 1/5 the time for a new building).

Design and Construction: 4 months (about 1/5 the time for a new building).

Cost and Financing

	Annual Cost				Total Cost	
	Per Pupil		Per Square Foot			
Conditions	$	As % of New	$	As % of New	$	As % of New
Unaided lease	288	86	3.19	76	1,051,259	19

P.S. 26 - Continued

Comments: The costs represent projected total and annual "present values" per pupil and per square foot respectively for this converted building leased by the NYCBE for 10 years.

The figures indicate that the lease of this building is considerably cheaper than a new school building over both the short and long term.

Further projections suggest that purchase of this building, for an assumed 10 year use-life, would also have been cheaper than a new building, and if resold by the NYCBE at the end of 10 years purchase would be financially the most advantageous alternative.

The annual rental of $97,500 is based on a cost of $2.95 per square foot and includes the use of pianos, an organ, and much remaining furniture. All expenses (excluding exterior, structural and roof repairs) including renovations and repairs amounting to $22,000 so far, are paid for the NYCBE. State aid is not available to reduce the cost of this building.

Miscellaneous Comments

The relatively greater value per pupil than per square foot ("As % of New" in the cost analysis) reflects the absence of many special facilities in this converted building.

As far as the students and staff are concerned, the most serious problem is the lack of adequate outdoor play space; a side street, closed off to traffic and used at lunch hour, is unsatisfactory. A fairly large open alley way off the fire exits is also used and efforts are underway to "convert" this for ball playing.

As far as the custodian is concerned, his most serious problem with the building is its unconventionality with respect to Board of Education supply stocks. It is difficult for him to get replacements for lightbulbs, fuses and other items which are not used in the typical school. Furthermore, the dry cleaning of draperies, for example, is not covered by NYCBE operations budgets.

THE BLOCK SCHOOL

Address: Brooklyn, New York

Previously: Synagogue and Grocery store; before that, a supermarket

Opened: November 1971

Acquisition: 3 year lease

Educational Program

Capacity: 75.

Grade Organization: Pre-kindergarten (ages $2\frac{1}{2}$-$4\frac{1}{2}$).

Program Description: Open-space, self-directed, experimental program, attended half-day by students; the school's description of itself as a "one room school house," though factually inaccurate, is descriptive of a truth.

Comments: A flexible program is focused around numerous centers of activity designed to be attractive to children and allow them to inquire and discover at their own pace. The program, in which teachers try to act primarily as resources, also emphasizes parent participation and involvement.

Location

Neighborhood: Residential and light commercial.

Student Population: The students are chosen mostly at random from a nine block area surrounding the school (well within school district #18, the administrative locus of the school) and are representative of the multicultural community they are drawn from (Haitian, Puerto Rican, Jamaican, black and white American and Arabic backgrounds).

Facilities Inventory*

Instructional: 3 multi-use instructional rooms.

Special Instructional:** -Science; -math; -language; -art; -music; - theater; -carpentry; -home-making: -large muscle activity -play area; -block building; -general play; -audio-visual; (outdoor play area); ("quiet room for conferences).

*Parentheses "(...)" indicate facilities not included and notably lacking.

**Those special instructional areas marked by a dash(-) are included in the three larger multi-use rooms.

THE BLOCK SCHOOL-continued

Support: Office; storage; kitchen; cafeteria (areas of which are also used for music and creative movement); nurse's office; faculty workroom; student cloak area.

Comments: Two upstairs, converted apartments, intended as additional offices and conference (or "quiet") rooms have not been approved for occupancy.

Building

Area: 8,200 sf (gross including basement and second floor apartments); 5,800 sf (net, first floor instructional area).

Stories: 1½ plus basement (basement contains mechanical equipment and storage only).

Age: N.A.

Renovations: N.A.* (Various including conversion from supermarket to synagogue).

Structure: Masonry and wood.

Heating: 3 zones, gas/hot water. (Two thermostats located close to play areas).

Ventilating: Recirculating air fans connected to the air conditioning system.

Air Conditioning: Three zones (separate from heating) regulating air-cooled roof units.

Sanitary and Plumbing: Adequate (2 toilet areas plus additional toilet off of nurse's office.

Electrical: Adequate.

Lighting: Varies in different task areas. Combines florescent fixtures, incandescent lights and spots, and reostats.

Comments: One bearing wall along the length of the building divides it in two parts. Other interior partitions, few of which reach the ceiling, are made of sheetrock or molded plywood. Crank-operated casement windows are located along 1½ walls. Floor coverings vary and include carpet, linoleum, astroturf, and tiles. Ceiling finishes also vary including acoustical panels, exposed pipes and ductwork, and painted coffered ceiling tiles.

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*Renovations indicate year of building modernizations prior to conversion to a school.

THE BLOCK SCHOOL-continued

Extent of Renovation (circled)*

0	1	2	3	4	5
(None)					(Complete)

Comments: A hole cut in the bearing wall from the synagogue to the grocery store was the only major demolition work performed. In many places existing conditions were preserved, particularly where old materials were felt to have an irreplaceable charm (such as the floor tiles and the coffered ceiling in the old grocery portion which were cleaned up and painted). Existing lighting was reused and new lighting added; existing wiring and plumbing fixtures were good though some new toilets were added; air conditioning was installed, and partitions were constructed.

The building has not been trouble free, and many of the otherwise manageable problems have been compounded by disputes between the landlord and the tenant. The building opened with broken windows, a defective flue in the heating system, and an inoperative staff toilet. A simple malfunction in the air conditioning, thought to be complicated and thus the subject of a long protracted dispute, has finally been corrected. Since the building opened new sewer lines and a water main have been installed. The windows are mostly defective and consequently have been screwed shut, cutting off most of the natural ventilation.

Environmental Considerations

Spatial: Flexible, varied stimulating areas, though unsuited for traditional educational programs, enhance this curriculum; steps, ladders, multi-levels, curved and angular partitions invite one in and lead through ever changing space; the resultant variety would seem to belie the small size of the building yet still adds to the intimacy of the program; lack of an outdoor play area is the major spatial shortcoming.

Visual: Varied lighting, graphics, and bright color highlights further contribute to the varied stimulation.

Acoustical: Carpeting, acoustical paneled ceilings and furnishings appear to control noise in most areas; loud exterior noises (such as an occasional passing truck on the lightly

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*The meaning of the numbers, rating the extent of renovation is: (1) cleaning and cosmetic patching; (3) systems upgrading, minor structural changes, and non-structural modifications; (5) complete gutting and new systems; and (2) and (4) are in between.

trafficked street) penetrate the lunchroom (large showcase windows, ceramic tile floors and coffered ceiling) but noise in this room appears not to have been noticed by the staff.

Thermal: Three heating zones should be enough for a building this size, however, two of the thermostats were unwisely placed next to play areas, resulting in insufficient heat to other areas of those same zones; the leaky windows, since sealed, have had negative consequences for both heating and ventilation; the air condition, though frequently broken, has otherwise functioned adequately; (circulating air fans have not been affected by the air conditioning breakdowns).

Esthetic: This creative and varied conversion (which won a national architectural award), through its spatial, visual and acoustical characteristics, evokes changes in mood as one moves from area to area. The creativity of the interior is totally unanticipated from the unadorned masonry exterior.

Comments: It is to be noted that the interior is not a composite of unmitigated environmental stimulation. The variety spoken of includes more subdued reading and study areas and private alcoves as well as unusual climbing areas and action spaces.

Time

Planning to Opening: 30 months (slightly more than 1/3 the time for a new building).

Design and Construction: 9 months (about 2/5 the time for a new building).

Cost and Financing

	Annual Cost				Total Cost	
	Per Pupil		Per Square Foot			
Conditions	$	As % of New	$	As % of New	$	As % of New
Unaided lease	801	185	10.36	211	180,280	12

Comments: The costs represent projected total and annual "present values" per pupil and per square foot respectively for this converted building leased by the NYCBE for 3 years.
The building was originally acquired specifically for the Block School Program which was funded (through January 1973)

THE BLOCK SCHOOL-continued

by a Federal grant under Title III of ESEA. The three year lease was based on the duration of the funding which covered nearly all expenses. Additional financial assistance, specifically for the renovation, was given by the Educational Facilities Laboratories (a non-profit organization).

The above figures (which in this case represent a total public cost, not just the cost to NYC) indicate that, while considerably cheaper (12%) than a new building for the short term need, the annual values over the long term are much higher than a new school. These high costs are primarily the result of extensive renovations (costing $90,000) amortized over such a short period. A longer lease (which, in fact, is currently being negotiated) would progressively decrease the annual values.

Renovations of the building for school use were performed under the auspices of the landlord according to specifications of the Block School staff and the NYCBE. The total annual rental payments of $60,000 include building rent ($26,000) and amorti ation and interest on the renovations ($34,000).

Projections suggest that purchase of this building for an assumed life-use of 25 years would have been economically the most advantageous alternative over the long term (with annual values less than 2/3 the cost of a new school building).

Miscellaneous Comments

The relatively greater value per pupil than per square foot ("As % of New" in the cost analysis) reflects the compactness of the design and the lack of spatial isolation for each of the special areas.

The staff, students, evaluation teams, and apparently, most visitors are unusually enthusiastic about this building. Nevertheless, the program and its history have been beset by continuous problems including funding, deadlines, the HVAC system, outside cooperation, determination of responsibility, and the like. Pertinent here are the disputes between the landlord and the tenant (NYCBE) concerning responsibility for aspects of the building, which often have resulted in inconvenience and discomfort to students and staff. Such has been the case with the air conditioning and second floor apartments.

Upon termination of the Federal funding in early 1973 the local school district designated the Block School as an annex to a nearby elementary school for the duration of the lease. Recently a bilingual component was added to the program.

LOWELL H.S. ANNEX

Address: Lowell, Mass.

Opened: September 1972

Previously: AVCO Industrial Building (#11)

Acquisition: 1 year lease (with 10 month option)

Educational Program

Capacity: 1000 (875 as used first year).

Grade Organization: Used as self-contained annex to main building for entire ninth grade. Central district administrative offices were also housed in this building.

Program Description: Large open space is subdivided by 5½ foot partitions into rectangular, self-contained classrooms.

Comments: Basically traditional program schedule; 7 period day, plus lunch, with room changes each period.

Location

Neighborhood: Located in industrial park area, convenient to interstate and other major highways and close to rail siding; shares (with two other buildings) 14 acre site; ideal industrial location.

Student Population: All students were bused.

Main School Building: Located four miles away.

Facilities Inventory*

Instructional: 32 classrooms.

Special Instructional: Library/materials center - section of 4 classrooms ; 2 home economics; 2 industrial arts; 2 art rooms; language lab; girls' gym; boys' gym; (science labs).

Support: District administrative offices; administrative offices for school; kitchen; 500 seat cafeteria; teachers' dining room; separate boys' and girls' lockerrooms; vast parking - doubles for outdoor play area; (student area or lounge).

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*Parentheses "(...)" indicate facilities not included and notably lacking.

LOWELL H.S. ANNEX-continued

Building

Area: 90,000 sf (instructional area, 60,000 sf; district administrative offices, 16,000 sf; and cafeteria area, 14,000 sf).

Stories: 1½ (split level).

Age: 1959.*

Renovations: None.**

Structure: Masonry and structural steel frame; rectangular columns (1 by 2½ feet) are located in pairs (separated by 8 feet) along an otherwise 22 foot by 58 foot grid.

HVAC: Combination oil and gas fired, low pressure steam boilers; multi-zones.

AC: Entirely.

Sanitary and Plumbing: Adaquate; (three sets of toilet areas, plus separate toilets for kitchen area); separate boys' and girls' lockerrooms and showers; sprinkler system throughout.

Electrical: Adequate (480/120/208 volts, 2000 KVA; and one double outlet per classroom area).

Lighting: Above standard (averages 75-100 FCs in instructional areas, ranging upward under skylights over corridors as high as 400 FCs).

Elevators: None.

Comments: Window requirement is satisfied by green tinted skylights running in 7 foot wide strips above corridors. The height of the 5½ foot, demountable sheet rock partitions which define classroom areas was in large part determined by natural light requirement; carpeting throughout instructional areas.

Extent of Renovations (circled)***

0	1	2	3	4	5
(None)					(Complete)

*Age indicates date of original construction.

**Renovations indicate year of building modernizations prior to conversion to a school.

***The meaning of the numbers, rating the extent of renovation is: (1) cleaning and cosmetic patching; (3) systems upgrading, minor structural changes, and non-structural modifi-

LOWELL H.S. ANNEX-continued

Comments: The conversion of this building was accomplished literally over a weekend by AVCO, the landlord. This occurred because the school committee did not approve and sign the lease until just before school was scheduled to open. Over the weekend old interior walls were removed, carpeting was laid, new partitions were assembled, and the whole area was given a thorough cleaning. Subsequently, to satisfy codes, AVCO cut holes and added three sets of double doors, two fire escapes, constructed a ramp for handicapped chilren, and added toilets and showers, all for the price of the lease. AVCO also supplied the furniture.

Environmental Considerations

Spatial: As designed, the instructional areas have most of the disadvantages of open space and few of the advantages. A large (approximately 40,000 sf), potentially flexible open space has been divided into uniform, repetitive rectangles with walls too low to decorate (and, indeed, an absence of other display space). The resultant sections are neither open and flexible nor private. Trouble or skirmishes in one area attract widespread attention. While the spaciousness of the vast open instructional area has its advantages, it lacks on definition.

Also the gym spaces are small, better suited to wrestling, gymnastics, and other contained activities than to ball playing. The cafeteria is sufficiently large to double as an auditorium.

Visual: The visual characteristics of the building are, in most aspects, excellent. Lighting levels are high and uniform in task areas, and free of glare (due to tinting of the skylights). The skylights add a particularly dramatic dimension to the space even though not optimally utilized by the spatial layout. Lighting zones, however, are rather inflexible with sections of four classrooms under single controls.

Acoustical: Noise is a definite environmental problem. Noise is poorly controlled in the open space, with untreated corrugated ceilings, in spite of the carpeting and low wall partitions. The problem was anticipated but the promises of the landlords and their architects to install acoustical baffles went unfulfilled.

Thermal: The HVAC system has been fine. The air conditioning is especially appreciated.

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cations; (5) complete gutting and new systems; and (2) and (4) are in between.

LOWELL H.S. ANNEX-continued

Esthetic: The potential and flexibility of this particular industrial building (which reputedly won an architectural award when it opened) has not been fully realized in the conversion to a school. While the systems are all adequate, or better, the exciting features of the building, particularly the large spaces and the skylights, have not been utilized to their greatest advantage. (Perhaps with more planning time greater imagination might have come into play.)

Time

Planning to Opening: 2 months (approximately 5% of the time for a new building).

Design and Construction: About 1 week.

Comments: Negotiations for the building began in mid-July, and the lease was signed the end of August, the Friday before school was scheduled to begin. And although the conversion were performed over the weekend with utmost speed and precision, school opening was postponed a week so that assignments, transportation and other logistics could be arranged.

Cost and Financing

	Annual Cost				Total Cost	
	Per Pupil		Per Square Foot			
Conditions	$	As % of New	$	As % of New	$	As % of New
Aided lease	113	62	1.69	97	152,309	1

Comments: The costs represent projected total and annual "present values" per pupil and per square foot respectively over the 1 year lease of this converted building.

The annual rental payment of $337,500, figured at the rate of $3.75/sf, includes virtually all costs: renovation, furniture, insurance, custodial staff, watchmen and utilities were all paid for by the owner (AVCO).

Furthermore, AVCO resumed full tax payments (of $200,000/year) to the City of Lowell after having received an abatement during the preceding two years because the building was vacant. In a very real sense, therefore, Lowell made money on the deal. In addition, under Massachusetts law the school district received state aid for the cost of the rental.

The figures indicate that this leased building is considerably cheaper than a new school building both in the short and long term.

LOWELL H.S. ANNEX-continued

Further projections suggest that purchase of this building over the long term would have been still cheaper.

Miscellaneous Comments

The relatively greater value per pupil than per square foot ("As % of New" in the cost analysis) reflects the more intense utilization and the absence of some special facilities in this converted building.

The conversion and lease of this building was a welcome outcome for both parties involved. The building had been vacant for two years and was costing AVCO money. The lease was a way of reducing their loses. The high school, terrifically overcrowded (enrollment nearly 60% above capacity), and located in the heart of the downtown where identification and sorting of those who belonged was particularly difficult, was plagued by three especially serious problems: drugs, absentees, and failures. Based on the record of the first year in the annex the seriousness of all three of these problems was drastically reduced.

The lease, however, was not renewed and purchase negotiations were dropped as a result of a financial dispute between the city manager, who was intent on reducing the property tax rate, and the school board. In a complex situation fraught with politics and involving charges of corruption, personnel changes and a law suit by the school authorities against the city manager (which was also dropped) the annex was lost - in spite of the fact that the state's accreditation of the city's schools was thereby endangered. (The last evaluation, which granted provisional accredition, recommended that the ninth grade be removed from the high school. The AVCO annex would have satisfied this condition.)

The annex, however, was by no means ideal. The beginnings were chaotic as a result of the hasty opening and such things as alarms being inadvertantly tripped (AVCO, a defense contractor, had a tight security system). The building is located in a distant corner of the city and somehow a status disparity developed between the annex and the main building. Indisputably, however, financially the annex was a boon.

PAS/ILC, 5th & LUZERNE BUILDING

Address: 5th & Luzerne Sts.
Philadelphia, Pa.

Opened: Various dates beginning September 1967

Previously: Apex Hosiery Factory

Acquisition: Purchase

Educational Program

Capacity: 650, based on actual use figures for two programs (PAS with average enrollment of about 300, and ILC with enrollment of 350; various other programs at different times have also simultaneously been housed in the building but enrollment figures for these are not available; with different design and utilization patterns a comfortable capacity of between 1200 and 2000 students might be attained).

Grade Organization: Equivalent of grades K-12 in various programs (at one time or another), most notable of which are:
- The Pennsylvania Advancement School (PAS) for students, teachers, R and D, etc. grades 7-8;
- The Intensive Learning Center (ILC) for students grades K-6 grouped in three semi-autonomous "houses" (grades K-2, 2-4, 4-6), as well as staff development, R and D, etc.;
- Engineering Graphics Technology program, grades 9-12, approximately 100 students;
- Career Development Center, grades 8-12, for 200 students;
- Computer Center, grades 11-12, and staff and teachers from city Schools.

Program Description: The building has come to be identified primarily with two programs: the PAS, which was the first program to be housed in the building; and the ILC, which followed shortly thereafter; the Instructional Systems Computer Center, which provides data processing instruction for grades 11 and 12 as well as being the base for all computer assisted instruction in Philadelphia city schools, has also been permanently located in this building.

Comments: This converted building has been, in composite, a kind of comprehensive educational laboratory, the home of innovative and demonstration type programs, most notably the PAS and the ILC. At the start the modest goal of the PAS which was set up as a non-profit cooperation, was to "impact" on the entire city school system, focusing on the junior high schools. The various aspects of the program intended to achieve this end were: (1) an on-going, demonstration "internal" student program; (2) a "resident" student and teacher training program in which whole classes from surrounding JHSs attended the PAS for in-resident sessions, which changed from weeks (8, 14, etc.) to a full school year; (3) an "external" (outside the building)

program, primarily staff development, located in the JHSs, which in evolving began to emphasize "mini-schools", affiliated classrooms within JHS buildings; (4) research, curriculum development, and (learning) materials dissemination, as an outgrowth of the various programs; and (5) a training program for interns and college co-op students.

The ILC has had a more limited focus on direct (internal) instruction for children, in the process experimenting with different approaches to education in the three houses. "Tech house" (technology oriented) had a highly structured systems approach; "Inquiry house" was based on the British Infant School approach, and "Blend house" combined the other two. Staff training, research and curriculum development grew out of this in-house instructional program.

Both the PAS and the ILC have open space settings designed around resource centers, with considerable variety in spaces, materials and resources; both employ team teaching as well as individual pacing and discovery learning, and place heavy emphasis on affective classroom activities (that is, loose, enjoyable games and activities which elicit student's feelings, perceptions, and values).

The PAS and the ILC have now been combined, the curriculum, and R and D program have been cut back considerably, the PAS mini-school program sharpened and expanded, and as the original Title III, ESEA funding has run out, the now unified program has been assigned to a local school district (no longer city-wide, special program).

Location

Neighborhood: The building is located on a large irregular corner lot at a busy intersection.

Student Population: The students for both programs were originally selected city-wide from a "Title 1" population; that is, skill deficient children from low income families. Then 100% of the students were bused. Most children are still bused and are below norm, remedial students, but they are now drawn only from the local district.

Facilities Inventory*

Instructional: Open space areas; classrooms, small seminar room.

*This facility listing includes the entire building not broken down by program. Parentheses "(...)" indicate facilities not included and notably lacking.

Support: Administrative offices; nurses' office; computer center; teachers lounge; cafeteria -for 1000 people; kitchen; (parking).

Special Instructional: Music; art -with artist in residence ; science; theater in the round; printing; recording studio; video tape setup and complete wiring for closed and open circuit T.V.; photography; libraries; computer terminals; drafting program area; machine shop; building-wide recreation room/ student lounge; PAS girls' gym; PAS boys' gym; wrestling room; ILC play area; media rooms; various resource centers-e.g. math, reading, language; individual study carrels; small outdoor play area.

Comments: The building is very elaborately equipped (with the conversion of 1½ floors still incomplete). Play space, however, is deficient. The outdoor hardtop play area, a small open corner of the lot, is inadequate for the pupil population of the building. As a result territorial conflicts between older and younger students have arisen. Indoor play areas are limited, especially for the older students, by low ceilings and concrete columns. In the early years, before the cafeteria was completed, students took lunch in the classrooms.

Building

Area: 217,000 sf (not including basement); 36,150 sf per floor.

Stories: 6 plus basement (PAS occupies 3rd and 4th floors; ILC the 6th and one half of the 5th; the computer center the other half of the 5th, the Engineering Graphics Technology program now occupies half of the second floor; and the cafeteria and kitchen are in a portion of the first floor. The second floor has generally been used as a temporary holding area until renovation work on a particular areas was completed).

Age: 1929.*

Renovations: 1946.**

Structure: Reinforced concrete, encased steel, masonry and glass block in-fill, with 90 concrete columns per floor. Columns, ranging from 2½ feet to 1 foot in diameter (depending on the floor), are located along an 18½ foot by 15 foot grid.

Stairways: 6 remote stairways of which 4 are firetowers.

HVAC: Air conditioned building with mechanical ventilation system; ceiling ducts as well as two large, vertical ventilating air shafts.

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*Age indicates date of original construction.

**Renovations indicates year of building modernization prior to conversion to a school.

Sanitary and Plumbing: Barely adequate (three sets of toilets per floor located along three separate vertical cores; bottle type electric water coolers installed because additional plumbing for fountains proved too costly; sprinkler system throughout).

Electrical: Adequate (13,200/2,300/240 volt service), but wiring is old resulting in occasional partial brownouts.

Lighting: Adequate florescent fixtures throughout with some incandescent spot highlighting; average of 50-75 FCs in instructional areas).

Elevators: 2 passenger elevators (converted from 4000 and 5000 lb. capacity freight elevators).

Comments: Operable windows have been installed (for natural ventilation); one cinderblock fire wall subdivides the largest portion of the building [27,500 sf] before fire wall addition); portable furniture and demountable sheet-rock partitions (to dropped ceiling level) define most other walls in the building; dropped acoustical ceiling and carpeting are installed in most instructional areas.

Extent of Renovation (circled)*

0	1	2	3	4	5
(None)					(Complete)

Comments: This building exemplifies a seemingly haphazard approach to conversion, with no apparent long range, comprehensive plan. As needs arose and programs were designed, areas of the building were converted. The conversion is still incomplete with 1½ unfinished and unutilized floors awaiting remodeling. During the course of renovations the second floor was used as a temporary holding area until work on a particular space was completed.

The building was empty when ownership was taken, so with the exception of a non-fireproof portion of the building, which was removed, little demolition was initially required. And much of the existing plumbing, electrical and HVAC systems appeared good enough for reuse. Nevertheless, renovations were extensive. Because of seepage the entire exterior had to be cleaned and waterproofed; an exterior ventilating shaft was constructed; floors were resurfaced, a fire wall built,

*The meaning of the numbers, rating the extent of renovation is: (1) cleaning and cosmetic patching; (3) systems upgrading, minor structural changes, and non-structural modifications; (5) complete gutting and new systems; and (2) and (4) are in between.

partitions added, more toilet fixtures added, new lighting fixtures wired and installed, the acoustical ceiling hung; and the inoperative old freight elevators converted to passenger elevators.

From the beginning the building has entailed a continuous series of problems. Numerous code violations were corrected or resolved only to have new ones arise (largely for indirectly related political reasons).

The fire towers and stairways had to be rebuilt to meet codes (which in Pennsylvania require that they be enclosed for school use), at a final cost of $200,000. The code exception which had been granted on the infilled glass blocks (apparently added to increase air conditioning and heating efficiency was rescinded requiring the addition to the entire building of operable windows, at a cost of $190,000. Although the building had a sprinkler system, smoke detectors were required as well. However, then the Philadelphia Department of Licences and Inspection (the agency responsible for enforcing standards) rejected the already installed ceiling sprinkler design (in which the sprinklers were set above acoustic panels designed to melt when struck by water) so it had to be redone, at a cost of $40,000.

Other unanticipated repairs - such as the entire overhauling of the mechanical system ($305,000), extensive electrical alterations ($118,000), a break in the rooftop water storage ($23,000) - have resulted in further renovation and expense. At this point, excepting occasional breakdowns in the air-conditioning and elevators, the building appears to be in relatively good condition.

Environmental Considerations

Spatial: The instructional areas of the PAS and the ILC were designed to maximize flexibility, given the severe constraints imposed by the verticality of the building and the rectangular grid emphasis imposed by the columns. Flexible, varied and exciting spaces (including a theater-in-the-round) have resulted in spite of the limitations. Nevertheless, even in the open spaces (but not in the round theater) the bays within columns have proved to have enormous power in defining space use. A kind of territoriality has resulted in conflict with the team teaching notion. Experiments with symbols, graphics, color changes and the like are under consideration in an attempt to break the pattern.

Placing the youngest children (the ILC) on the highest floors (5th and 6th) had certain disadvantages, especially in the early years of the conversion when the elevators were not working. The vertical circulation problem to the outdoor play area and the cafeteria on the first floor for them was most acute. As a result children took their lunches in the class-

rooms with the teachers, and the school discovered unanticipated social benefits (which, unfortunately, did not accrue to the custodians who had to cart the refuse down six floors).

Visual: Even florescent lighting in instructional areas, additional spots in certain locations, extensive natural light through both operable windows and glass blocks, and bright colors, result in a pleasant visual environment.

Acoustical: Carpeting, treated ceilings, and varied drapes and furnishings control noise in most areas. The vertical air shafts, however, are extremely noisy and interfere with the areas immediately adjacent to them (only corridors on several floors).

Thermal: Except for still occasional breakdowns in the air conditioning, and the noise by-product of the air shaft, the HVAC system appears now to be functioning adequately.

Esthetic: The net effect of this huge and complicated building is a mixture of deficiencies and problems, creativity, flexibility, and comfort.

Comments: The six stairways and exits have presented problems of security and control. This, however, and other problems - such as the use of certain resources like elevators, outdoor play areas, and food services - have led to the positive outcomes of increased cooperation among the various programs in the building.

Time

Planning to Opening: Initially, 6 months for the PAS (about 1/10 the time for a new building).

Design and Construction: Various.

Comments: In this case the building had been purchased by the Philadelphia Board of Education and they did not know what to do with it. As it turned out, it has served as a holding ground, home and overflow center for various programs and several schools at different times.

Cost and Financing

PAS/ILC-continued

Purchase: Conditions	Annual Cost Per Pupil $	Annual Cost Per Pupil As % of New	Annual Cost Per Square Foot $	Annual Cost Per Square Foot As % of New	Total Cost $	Total Cost As % of New
Capacity of 1200, aided, resale	238	116	1.32	66	8,584,863	77
Capacity of 1200, aided, no resale	247	120	1.37	68	8,893,182	80
Capacity of 650, aided, no resale space prorated	304	148	1.56	78	5,928,788	99
Capacity of 1500, aided, no resale	198	96	1.37	68	8,893,182	64

Comments: The costs represent projected total and annual "present values" per pupil and per square foot respectively over the remaining life use of this building, assumed to be 30 years.

The figures indicate, under each set of assumptions, that for short term use, that is 30 years or less, this converted building is less expensive than a new school building. Similarly, over the long term (45 years) for each set of assumptions the annual value per square foot is also considerably less than a new building. However, only with a pupil enrollment of approximately 1500 or more (which, in fact, may occur in the near future) would the annual per pupil value compare favorably with a new school building. (It is to be noted that specific O and M costs for this and other Philadelphia schools were not available. O and M cost assumptions were, therefore, based on city-wide averages).

This building was acquired by the Philadelphia Board of Education for $859,000 and renovated by them at a cost (through June 1973) of $2,485,000, of which costs some components have previously been noted (see "Extent of Renovations," above). State aid was available to reduce the cost of this building to the city.

PAS/ILC-continued

Miscellaneous Comments

The relatively greater value per pupil than per square foot ("As % of New" in the cost analysis) for all the above cost projections reflects the unusually low utilization rate which has prevailed thus far in this building. For many years the square footage per pupil of PAS and ILC students was about 500 sf.

Considerable time, energy, enthusiasm, and planning went into the physical plant and all the various programs that occupied it. The problem was lack of a long range plan: who would occupy the building, when, for what purpose, was never fully considered. Consequently, the building and the programs within it, for the first six years, seem characterized by crises, flux, frustration, insufficient coordination and planning, and buffeting by powerful external factors (notably city politics and the school system's bureaucracy) and, on the more positive side, incomparable excitement, talent, creativity, and energy.

The building opened amidst controversy too closely identified with a new and highly controversial school superintendent. The PAS and the ILC (the two most widely known innovative programs) have only recently begun to recover from the adverse effects of all the early publicity.

Success among the various programs housed in the building, evaluated by different standards based on many objectives, has varied considerably. Quantitative achievements like test scores, attendance, R and D publications, teachers trained, etc. have been most clearly positive. Many of the other objectives, however, were over-optimistic and based on faulty assumptions. The PAS especially, adopted favorite child of the new superintendent (it was transplanted from North Carolina), was expected to "change the system," largely through its external program. As one observer commented, "it never had a chance."

WILLIAM H. TAFT H.S. ANNEX

Address: Bronx, New York

Previously: Elsmere Catering Hall and Stores

Opened: February, 1970

Acquisition: 10 year lease

Educational Program

Capacity: 350.

Grade Organization: This annex to main high school building houses special "College Bound" program, grades 9-11.

Program Description: Small class sizes (9 to 22 students per class) in self-contained rooms.

Comments: Lunch, boys physical education, and a few other activities are taken at the main building; otherwise annex runs independent, self-contained program.

Location

Neighborhood: Building located on commercial avenue in commercial/residential area.

Student Population: Most of the students are bused (i.e. by public transportation), attending from all parts of the borough.

Main School Building: Located 2 blocks away.

Facilities Inventory*

Instructional: 16 classrooms; small classroom.

Special Instructional: Library; art; gym - can be used for auditorium; (science); (typing).

Support: Offices; teachers' lounge; lockerroom; storage; (cafeteria).

Comments: Certain activities, including lunch, lab, science, typing, and boys' physical education are taken at the main building.

Building

Area: 45,00 sf (gross including basement); 29,000 (gross

*Parentheses "(...)" indicate facilities not included and notably lacking.

excluding basement); 24,600 (net usable area).

Stories: 2 plus basement (code allows storage use only in this basement).

Age: N.A. (approximately 60 years old).

Renovations:* N.A. (various).

Structure: Masonry and wood; in basement 9 inch columns are located along 14 by 24 foot grid; grid expands on upper floors (e.g. 28 by 24 foot on first floor).

AC: Yes (zones as above).

Sanitary and Plumbing: Adequate (boys', girls', and staff toilets on each floor; showers and additional girls' toilets in girls' lockerroom); sprinkler system throughout.

Electrical: Adequate.

Lighting: Meets standards (averages 55-75 FCs).

Elevators: None.

Comments: Windowless building; sheetrock partitions (defining rooms) rise slightly above dropped acoustical ceiling (not to structural ceiling); the air conditioning has posed continuous problems; only access to basement is via stairway from second floor.

Extent of Renovation (circled)**

0	1	2	3	4	5
(None)					(Complete)

Comments: Five stories, three ballrooms, a kitchen, storage space and a basement (with bowling alleys), were gutted in the conversion of this building to a school. Windows were filled in, air conditioning, which had been removed, was reinstalled, a new stairway was constructed; and toilets, new wiring lighting, and partitions were added. Workmanship was shoddy and inferior materials were used. The building opened with a checklist of 34 items unfinished, missing or inoperative,

*Renovations indicate year of building modernizations prior to conversion to a school.

**The meaning of the numbers, rating the extent of renovation is: (1) cleaning and cosmetic patching; (3) systems upgrading, minor structural changes, and non-structural modifications; (5) complete gutting and new systems; and (2) and (4) are in between.

ranging from improper finishes and peeling paint, to improperly installed door frames and door bucks (so that doors did not close properly), to insufficient thickness of enclosed windows, to missing equipment such as door stops, program clocks, and intercom systems. Typically, the tenant (NYCBE) would dispute the landlord's claim that such items had been installed when possession was taken and subsequently had been stolen. Many such matters remain unresolved.

Environmental Considerations

Spatial: Lackluster, celular-like, rectangular rooms, uniformly appointed with one chalk board and one display board; mostly small rooms (averaging about 400 sf) are adequate for the small class sizes; two large rooms (700 sf and 1000 sf) are used for art and the library; three staircases to exterior doors satisfy circulation requirements.

Visual: Inferior paint (and thus heavy scuffing of walls) and drab colors are moderated by fairly uniform lighting; the resultant visual dullness is unrelieved by windows.

Acoustical: Solid masonry walls effectively block out external noise. Acoustical conditioning within the building, however, is poor due to thin walls, hard, reflective linoleum floors, an open plenum above the dropped ceiling, connecting air vents, and generally slip-shod workmanship. Due to the acoustical conditions, musical activities are held in the morning before the regular program starts, and the typing class was relocated in the main building.

Thermal: Thermal conditions are adequate when system is not malfunctioning. Of the thermostatic zones, one controls the gymnasium (and unused basement).

Esthetic: Although the building serves its purpose the conversion may best be described as shoddy, flimsy and uninspired.

Time

Planning to Opening: 24 months (about 3/10 the time for a new building).

Design and Construction: 13 months (slightly more than ½ the time for a new building).

Cost and Financing

WILLIAM H. TAFT-continued

	Annual Cost				Total Cost	
	Per Pupil		Per Square Foot			
Conditions	$	As % of New	$	As % of New	$	As % of New
Unaided lease	423	106	5.12	139	1,483,509	24

Comments: The costs represent projected total and annual "present values" per pupil and per square foot respectively for this converted building leased by the NYCBE for 10 years.

The figures indicate that while the total cost is considerably cheaper than a new building, the annual values are much higher. One unusual factor influencing these values is the high rate of inflation on operations and maintenance costs so far (15% annually). A more moderate inflation rate (eg. 10%) would have resulted in lower values, about the same cost per pupil as a new building but still more expensive than the new building per square foot.

Renovations of the building for school use were performed under the auspices of the landlord according to NYCBE specifications. The annual rental payment of $139,500 includes an amount for renovations. This amount is based on a construction cost to the owner of approximately $400,000, plus an amount for interest, figures which were negotiated along with the lease. The actual cost to the owner may be more or less than the negotiated amount.

State aid is not available to reduce the cost of this building to the NYCBE.

Projections suggest that purchase of this building for an assumed use-life of 20 years would also have been cheaper for the short term and more expensive over the long term than a new building; at the high O and M inflation rate, and at the low O and M inflation rate, it would have been cheaper per pupil but the other conclusions still apply.

Miscellaneous Comments

The relatively greater value per pupil than per square foot ("As % of New" in the cost analysis) reflects the absence of many special facilities in this converted building.

For all its faults, students and staff appear to prefer the annex to the main high school building. They like the isolation and independence from the main building, the small size and intimacy of the building, the small classes, and their program. When, in 1972, the main school administration decided to transfer the College Bound program back to the main building

WILLIAM H. TAFT-continued

so that the annex could be used for other purposes, the staff vigorously argued the folly in the proposed plan and the potential harm it posed for the College Bound program. They won their fight.

The program appears to be very successful: school staff claim 95% of their students are accepted at colleges and maintain an 80% retention rate there. School attendance averages over 90% compared to about 70% in the main building.

Landlord-tenant relationships appear less than cordial. Numerous disputes over responsbilitity between the landlord (Columbia University) and the tenant (NYCBE), especially regarding the air conditioning, tend to have resulted in inconvenience and discomfort to the students and staff.

APPENDIX I

EDUCATIONAL PROGRAM AND BUILDING CONSIDERATIONS

Many buildings which, either because of their location or structural characteristics, are unsuitable for a full-fledged school program may nonetheless be well suited to other educational program approaches. It may be worthwhile to connect the relief of overcrowding, a typical goal, to a new program which increases the school's or school district's total educational offering. The ideas suggested below are not mutually exclusive.

School Annex

The most common approach to found space is to find buildings located in close proximity to an overcrowded school building for use as an annex for straight academic instruction. In such cases more specialized activities are taken care of in the main building.

Special Purpose Center

Automotive mechanics programs in automobile dealership buildings (showrooms and repair service); aviation mechanics in airport hangers; secretarial and business skills programs in office buildings, supermarkets and other open spaces; agriculture programs on farms; wood frame houses for home economics and basic carpentry. There are a few examples of building types which are especially well suited for occupational education programs. It is often possible to secure a zoning variance for the use of industrial buildings in industrial zones

when they are to be used for vocational education programs. It is wise to bear in mind, however, (particularly if you are a landlord) that once such a variance is obtained it may not be possible to again use the building for its originally intended purpose.

Storefronts on a small scale, movie theaters, bowling alleys, and various other buildings may be adapted as creative or performing arts centers, media centers, or special educational museums. (A railroad station in Baltimore, Md., an historic landmark, has been converted into a community arts college.)

Home Base Center

Buildings located in downtown areas, busy commercial areas, or areas with clusters of educational, medical, religious, or cultural institutions may serve as home base centers for "school without walls" programs, like the famous Philadelphia Parkway Program (or the Bartram Human Services School in Philadelphia or the Clinton J.H.S. program in New York City which were visited and described in this study). In such programs students spend a large portion of their day working on supervised, personal projects in actual settings. Core subjects, guidance, and reviews may take place at the home base.

Racial, Ethnic or Social Class Integrator

The location of school buildings on neighborhood borders as a means of promoting integration - a technique fraught with problems and controversy when applied to new school buildings - appears to be more easily accepted when that objective is connected to a special educational program in a found space

building. There are examples of bilingual schools, an ethnic museum, and homogeneous grouping programs which have achieved integration of black, Spanish-speaking, and/or white students in various places (for instance, the Ethnic Museum and the bilingual school, P.S. 211 in New York City, and the Hernandez Bilingual School and the Dennis Haley School in Boston).

Neighborhood Rejuvenator

Converting a vacant building may be a way of stemming blight and deterioration in a neighborhood. (The Block School, and the P.S. 219 Annex in New York City and the Hernandez Bilingual School in Boston appear to have exerted a stabilizing if not a revitalizing effect on their respective neighborhoods, probably also related to strong efforts by their staffs at increasing parent involvement.) A word of caution is in order here. Neighborhoods and the forces that make them what they are also have a strong effect on buildings and institutions within them. For this reason a major consideration of real estate appraisers of building O and M costs and building life expectance is the neighborhood in which it is located. (The Acorn School in New York City, a middle class private school in the commercial space of a lower-income, problem-ridden building, has suffered extensive vandalism and harassment.)

Community and Educational Service Centers

A growing movement in educational facilities are schools which are part of a community focal center, which operate

throughout the day and share their services, facilities and, not least importantly, financing with other segments of the community: art groups, senior citizen centers, day care programs and various otherprograms. Landmark buildings, focal community institutions (e.g., a Post Office converted to a vocational school in Toledo, Ohio), buildings with a central location easy access, and/or varied spaces may serve well for such purposes.

BIBLIOGRAPHY

Found Space Reports

Caudill, Rowlett Scott. Space Is Where You Find It: A Study to Determine the Educational Potential of a Retired Government Testing Laboratory. For the School District of Philadelphia under a grant from the Educational Facilities Laboratories, 1968.

Educational Facilities Laboratories. Found Spaces and Equipment for Children's Centers. New York: Educational Facilities Laboratories, 1972.

Educational Facilities Laboratories and Experimental Schools (U.S. Office of Education). Places and Things for Experimental Schools. New York: Educational Facilities Laboratories, 1972.

Molloy, Lynn. Found Space for Community Cultural Centers (unpublished), 1973.

Morisseau, James J. "Recycled Space and Found Space." Planning for Higher Education.2, No. 3 (June 1973).

Murphy, Levy, Wurman. The Loft Building as a School House: A Study for the School District of Philadelphia. New York: Educational Facilities Laboratories, (undated).

Protected Educational Facilities in Found Space. TR-78. Developed and Prepared by the Council of Educational Facilities Planners, International. Columbus, Ohio: U.S. Office of Education, Department of Health, Education and Welfare, and Defense Civil Preparedness Agency, Department of Defense, 1973.

General: Books and Reports

Association of School Business Officials and Council of Educational Facility Planners. Educational Facilities Abstract Journal. Vol. II, 1969. Houston, Texas: 1970.

Barker, Roger G. and Gump, Paul V. Big School, Small School, High School Size and Student Behavior. Stanford, California: Stanford University Press, 1964.

Berlowitz, Manfred, Drucker, Eugene E., Scarbrough, William H., Syracuse University Research Institute. Thermal

Environment of Educational Facilities: A Guide for Planners and Administrators. Prepared under the sponsorship of the Division of Educational Facilities Planning, New York State Education Department. 1969.

Building Code of the City of New York. New York: Van Nostrand Reinhold Company, 1970.

Campbell, Aldrich and Nulty. A Systems Approach for Massachusetts Schools. A Study of School Building Costs for the Massachusetts Advisory Council on Education. Boston: 1972.

Council of Educational Facility Planners. Guide for Planning Educational Facilities. Columbus, Ohio: 1969.

Educational Facilities Laboratories. Guide to Alternatives for Financing School Buildings. New York: November 1971.

________. Relocatable School Facilities. New York: 1964.

________. Schools: More Space/Less Money. New York: 1971.

________. Schools Without Walls, Profile of Significant Schools. New York: 1965.

________. To Build or Not to Build: A Report on the Utilization and Planning of Instructional Facilities in Small Colleges. New York: 1962.

________. IDEA. The Open Plan School. Report of a National Seminar. New York: 1970.

Fitch, James Marston. "The Future of Architecture." The Journal of Aesthetic Education No.4 (January 1970).

Fitzgibbon, James and Thomas L. Thomson. Urban School Construction: A Case Study of Alternative Financing Methods for St. Louis, Missouri. St. Louis: Educational Facilities Laboratories. 1971.

Fitzroy, Daniel and John Lyon Reid. Acoustical Environment of School Buildings. Technical Report No. 1. New York: Educational Facilities Labor tories, 1963.

The Fleischmann Report on the Quality, Cost, and Financing of Elementary and Secondary Education in New York State. 3 vols. New York: Viking Press, A Viking Compass Book, 1972 and 1973.

Griffin, Jr., C.W. Systems: An Approach to School Construction. New York: Educational Facilities Laboratories, 1971.

Jones, Howard Mumford, Editor. Emerson on Education. New York: Teachers College Press, 1966.

Lieberman, Rachel Radlo. Urban Educational Facilities Options. The final report of the New York City School Space Study Committee. New York: Educational Facilities Laboratories, 1972.

McGuffey, Carroll W. MEEB: Model for the Evaluation of Educational Buildings. Chicago, Simu-School, 1974.

McLeod, Ferrara and Ensign, AIA. School Renewal. A Report supported by Educational Facilities Laboratories, 1973.

Manji, Ashraf S. (Project Manager). Simulation for Educational Facility Planning: Review and Bibliography. Project Simu-School: Chicago Component under a grant from U.S. Office of Education. Chicago: Board of Education, 1974.

New Life for Old Schools. Chicago: Research Council [of the Great Cities Program], reprinted December 1968.

Research Staff, Center for Architectural Research. Rensselaer Polytechnic Institute. Acoustics and Educational Facilities: A Guide for Planners and Administrators. Troy, New York: Division of Educational Facilities Planning, New York State Education Department, 1966.

Sampson, Foster K. Contrast Rendition in School Lighting. New York: Educational Facilities Laboratories, 1970.

Sommer, Robert. Personal Space: The Behavioral Basis of Design. Englewood Cliffs, New Jersey: Prentice-Hall, A Spectrum Book, 1969.

Vidler, Anthony and Caruso, Joseph (APRA). Spaces for Learning: Environmental Quality and the Educational Program. (A Report to the New York State Commission on Education) 1971.

Washington State Board of Education. A Study of Feasibility of Providing State School Building Funds for Renovation or Modernization of School Buildings and Other School Facilities. Olympia, Washington: ERIC Document Reproduction Service, EF 000 029, 1963.

Weinstock, Ruth. Space and Dollars: An Urban University Expands. New York: Educational Facilities Laboratories, 1961.

Weston, J. Fred. Managerial Finance. New York: Holt Rinehart & Winston, 1962.

General: Articles, Magazines, Journals and Serials

Brunetti, Frank A. Open Space: A Status Report. Occassional Paper, no. 1. Stanford, Calif.: School Planning Laboratory, August 1971.

Engineering News Record. 1972 through 1973 inclusive.

Graves, Ben E. "Repair or Replace: Here's How to Decide." American School Board Journal, April 1972.

King, Jonathan. "Ding, Dong, Dull." Architectural Design, May 1968 .

L'Hote, John D. "Major Considerations in School Modernization--Age, Location, Educational Adequacy." New Life for Old Schools Newsletter, no. 22 (October 1967).

"Maintenance and Operations Cost Study." American School and University. Prepared under the guidance of Paul Abramson. February, April, June, and August 1972.

Poehlein, Gary W., Santore, Anthony C., Zajacek, George P. "Evaluation of Expenditure Alternates." CEFP Journal, September-October 1973.

Reports of Building Owners and Managers Association International. Chicago: 1971, 1972, and 1973.

Shobe, Earl J. "Criteria for Deciding to Remodel the Existing School." New Life for Old Schools Newsletter, no. 16 (March 1967).

U.S. Department of Commerce. Construction Review: Monthly Industry Report, Washington, D.C.: Government Printing Office, 1965 annual report through September 1973, inclusive.

General: Unpublished Reports, Memos, Etc.

Department of Buildings and Grounds, Columbia University. "Housekeeping Report." July 1, 1966-June 30, 1967; 1969-1970; 1971-1972; and 1972-1973.

Department of Buildings and Properties, Cornell University. "Operations and Maintenance Functional Cost Survey of 8 Universities." Ithaca, New York, July 1972.

Department of Buildings and Grounds, Teachers College, Columbia University. "Buildings and Grounds Department Report 1971-1972." New York

New York City: Publications

Cresap, McCormick and Paget Inc. Physical Plant Summary for New York City Community School Boards. Prepared for New York City Board of Education, September 1970.

Mayor's Office of the City of New York, Annual Report on Management of New York City's Capital Construction Program. January 1972.

Mayor's Office of the City of New York, Office of Director of Construction. Building for the 70's, Annual Report on the Management of New York City's Capital Construction Program. 1971.

New York City Board of Education. 1973-1974 Space Procurement Program and 1974-1979 Capital Improvement Plan. 6 December 1972.

New York City Board of Education, Office of High Schools. From Hotel to High School. Report and Recommendations of the Concourse Plaza High School Planning Committee. Educational Facilities Laboratories, 1972.

Urban Design Council (Office of the Mayor). Report on the Working Relationship of Architects and the City of New York. November 1971.

New York City: Unpublished Memos, Statistics, Data, Etc.

New York City Board of Education, Bureau of School Financial Aid. "Bond Interest Rates, 1970-1973." 16 October 1973.

________. Bureau of School Financial Aid. "New York City School Cost and SED Allowance for State Aid, for Years 1962-63 through 1970-71." 14 September 1971 and 17 October 1973.

________. "Total Construction Costs, Building Allowances and Site Costs, in New York City, 1965-66 to 1970-71." 1972.

________. Office of School Buildings. "School Construction Costs: Bid Statistics for New School Projects, 1965-1973." October 1973.

________. "Costs of Plant Maintenance for Leased Buildings." 5, 7, 11 and 26 September 1973.

________. "Costs of Plant Operation of Various Leased Premises." 7 September 1973.

________. Office of the Secretary. "Procedures to be Followed for the Approval and Execution of Leases." 2 August 1971.

________. School Planning and Research Division. "Facilities Leased by the Board of Education." 3 vols. "1970-71," 1971-72," and "1972-73."

New York State: Publications

Conference of Large City School Boards of New York State. An Identification of the Critical Educational and Financial Needs Existing in Large City School Districts in New York State with Recommendations for Legislative Action. October 1970.

New York State Department of Education. Art. XX. Regulations of the Commissioner of Education. (Undated.)

________. Division of Educational Facilities Planning. Manual of Planning Standards for School Buildings. 2nd ed.: 1967. Revised. Albany, New York: 1973

________. School Facilities Planning and Management News vol. I no 1. through vol. 7 no. 2. November 1965 through February 1974, inclusive.

________. Semi-Annual School Cost Report and Statistical Data, Summary of Costs Per Square Foot. Albany, New York: March 1966 to September 1973, inclusive.

________. Division of Educational Finance. State Aid for Elementary and Secondary Education in New York State as Apportioned in 1967-68 to 1971-72 inclusive. Albany, New York.

________. Information Center on Education. Basic Educational Data System (BEDS) Enrollment and Building Age Data. For years 1967-1970, inclusive.

New York State: Unpublished Memos, Statistics, Data, Etc.

NYSED, Bureau of Educational Finance Research. "State-Aid for Building in New York State (Total): Yonkers, Albany, Syracuse, Rochester, Buffalo." 1965 through 1969-70.

________. Division of Educational Facilities Planning. "Monthly Cost Allowances Per Pupil for School Building Aid in New York State, January 1964 to July 1973."

Other Governmental: Publications

School District of Philadelphia. Proposed 1972-1973 Capital Budget, 1973-1978 Capital Program. Philadelphia: 13 March 1972.

Other Governmental: Unpublished Memos, Statistics, Data Etc.

Boston Public Facilities Department. "Contract Costs for Various Converted School Buildings." September 1973.

Boston School Committee, Chief Plant Engineer. "Operations Costs for Various Converted School Buildings." 29 June 1973.

________. Educational Planning Center. "Program Documents, Needs Assessment and Process Reports." 1971-1972.

________. "Reading Scores, Attendance Data, Teacher Experience, and Other Data for Selected Boston City Schools, and City-Wide Averages, 1971-72." 3 July 1973.

School District of Philadelphia, School Facilities Division, Department of Arthitecture, Engineering and Construction Services. "Contract Costs for Various Converted School Buildings." 1 June 1973.

Newspapers

New York Times. January 1971-November 1974, inclusive.

"Gives Reasons for Delays in Replacing Aged School." New York Daily News. 13 February 1974, p. ML 7.

Miscellaneous Documents

Albee, Edward. The Zoo Story. New York: New American Library, Signet Books, 1963.

American Institute of Architects. Statement of the Architects' Services. AIA Document B551. Washington, D.C.: 1971.

________. New York Chapter. Schedule of Compensation. New York: 1969.

Hill, Morris. "A Goods-Achievement Matrix in Evaluating Alternate Plans." Journal of the American Institute of Planners 34 (1968).

Litchfield, Nathaniel. "Evaluation Methodology of Urban and Regional Plans: A Review." Regional Studies 4 (1970).

Michael, Henry L., and Grava Sigurd. "The Planning Balance Sheet and the Barrio." Worldwide P. and I. Planning. (Undated.)

Meier James, "Economic Development for an Indian Village." Fall, 1968 [unpublished].